Hustler® Raptor®
Operator's Manual

HUSTLER TURF EQUIPMENT

200 South Ridge Road

Hesston, Kansas

67062

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GENERAL INFORMATION

This manual applies to the following Hustler® Turf Equipment equipment lines:

Hustler® Raptor®

To The New Owner

The purpose of this manual is to assist owners and operators in maintaining and operating your Hustler® mower. Please read it carefully; information and instructions furnished can help you achieve years of dependable performance.

A separate Engine Owner's Manual is included with your owner's packet which contains additional engine information that will not be repeated in this manual. It is the owner's responsibility to make certain that the operators and mechanics read and understand the engine owner's manual before attempting to operate or repair the engine.

The decals are designed to give the operator brief information needed in the daily operation and service of the machine. These decals are not intended to be used in place of this manual but instead are to be used as an extension of this manual. These decals should not be removed or obliterated. Replace these decals if they become unreadable.

It is the **owner's responsibility** to make certain that the operators and mechanics read and understand this manual and all decals before operating this machine. It is also the **owner's responsibility** to make certain that the operators and mechanics are qualified and physically able individuals, properly trained in the operation of this equipment. All operators and mechanics must become familiar with the safe operation of the equipment, operator controls and decals.

IMPORTANT: The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.

Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.

For more detailed maintenance and adjustment information refer to the proper *General Service Manual* for your machine. Refer to the *"Product Literature"* section of this manual for information on how to attain these manuals.

Using This Manual

General operation, adjustment and maintenance guidance is outlined for both the experienced and novice Hustler® user. Operating conditions vary considerably and cannot all be addressed individually. Through experience, however, operators should find no difficulty in developing good operating skills suitable to most conditions.

Directions used in this manual, for example RIGHT or LEFT, refer to directions when in operator position and facing forward, unless otherwise stated.

Photographs and illustrations used were current at the time of printing, but subsequent production changes may cause your machine to vary slightly in detail. Hustler® Turf Equipment reserves the right to redesign and change the machine as deemed necessary, without notification. If a change has been made to your machine which is not reflected in this operator's manual, or the parts manual, see your Hustler® Dealer for current information and parts.

Warranty Registration

There are several ways to register the mower with Hustler Turf Equipment:

- **Hustler® Dealers must** register the unit on-line at **https://dealer.hustlerturf.com** within **ten (10) days** following date of purchase.
- **Customer** may register the unit on-line at **www.hustlerturf.com** or by **mailing in the Warranty Registration Card**, included in the owner's packet, within **ten (10) days** following date of purchase.

As the new equipment owner, you should confirm that your mower has been registered with Hustler® Turf Equipment.

Be sure to register the mower plus each attachment that displays a model and serial identification number plate with Hustler® Turf Equipment.

IMPORTANT: Any unauthorized modification, alteration, or use of non-approved attachments voids the warranty and releases Hustler® Turf Equipment from any liability arising from subsequent use of this equipment. Do not use or operate any attachment not approved by Hustler® Turf Equipment.

Model And Serial Number

Mower model and serial numbers are found on the serial identification plate, located on the left mower frame side rail.

These numbers are required when the unit is registered with Hustler® Turf Equipment. They will also assure you of the correct service parts when replacement becomes necessary.

Parts And Service

Use original Hustler® replacement parts only. These parts are available through your local Hustler® Dealer. To obtain prompt, efficient service, always provide the following information when ordering parts:

1. Correct part description.
2. Correct part number.
3. Correct model number.
4. Correct serial number.

All warranty repair and service must be handled through an authorized Hustler® Dealer. Arrangements should be made through your local service center.

WARNING

The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

NOTICE OF REQUIREMENT OF SPARK ARRESTER MUFFLER

This equipment may create sparks that can start fires around dry vegetation. California Public Resources Code Section 4442.6 provides that it is unlawful to use or operate an internal combustion engine on any forest-covered, brush-covered, or grass-covered land unless the engine is equipped with a spark arrester maintained in effective working order. A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service. Other states or federal areas may have similar laws. The Operator Should Contact Local Fire Agencies For Laws or Regulations Relating to Fire Prevention Requirements. THIS EQUIPMENT DOES NOT HAVE A SPARK ARRESTER AND YOU SHOULD CONTACT YOUR AUTHORIZED DEALER FOR THE PURCHASE OF A SPARK ARRESTER.

Inspect spark arrester daily; replace every 500 hours or as needed.

The Engine Owner's Manual provides information regarding the U.S. Environmental Protection Agency (EPA) and the California Emission Control Regulation of emission systems, maintenance and warranty.

Keep Engine Owner's Manual with your unit. Should the Engine Owner's Manual become damaged or illegible, replace immediately. Replacements may be ordered per the information found in the Product Information section of the owner's manual.

Federal law and California State law prohibit the following acts or the causing thereof:

1. The removal or rendering inoperative by any person other than for purposes of maintenance, repair, replacement, of any device or element of design incorporated into any equipment for the purposes of emissions control prior to or after its sales or delivery to the ultimate purchaser or while it is in use, or
2. The use of the equipment after such device or element of design has been removed or rendered inoperative by any person.

SAFETY PRECAUTIONS

This safety alert symbol is used to call attention to a message intended to provide a reasonable degree of **PERSONAL SAFETY** for operators and other persons during the normal operation and servicing of this equipment.

DANGER

– denotes immediate hazards which WILL result in severe personal injury or death.

WARNING

– denotes a hazard or unsafe practice which COULD result in severe personal injury or death.

This manual uses two other words to highlight information. **IMPORTANT** calls attention to special mechanical information and **NOTE** emphasizes general information worthy of special attention.

All operators and mechanics should read this manual, and be instructed about safe operating and maintenance procedures. If the operators or mechanics cannot read and understand English, it is the owner's responsibility to explain this material to them.

Improper use or maintenance by the operator or owner can result in injury. To reduce the potential for injury, comply with these safety instructions and always pay attention to the safety alert symbol "▲", which means DANGER or WARNING - "personal safety instructions." Failure to comply with the instructions may result in personal injury or death.

Incorrect usage of this mower may result in severe injury. Personnel operating and maintaining it should be trained in the proper use and should read the manuals completely and thoroughly before attempting to set-up, operate, adjust, or service this mower.

Safety And Instructions Decals

The decals are designed to give the operator brief information needed in the daily operation and service of the mower. These decals are not intended to be used in place of this manual but instead are to be used as an extension of this manual. These decals should not be removed or obliterated. Replace these decals if they become unreadable.

- It is the **owner's responsibility** to make certain that the operators and mechanics read and understand this manual and all decals before operating this mower.
- It is also the **owner's responsibility** to make certain that the operators and mechanics are qualified and physically able individuals, properly trained in the operation of this equipment.
- All operators and mechanics must become familiar with the safe operation of the equipment, operator controls and decals.
- Never let children or untrained people operate or service the equipment. Local regulations may restrict the age of the operator.
- The owner/user can prevent and is responsible for accidents or injuries occurring to themselves, other people or property.
- The owner should also ensure that the operators/mechanics know that they are responsible for their own safety as well as the safety of other persons within the vicinity. **Remember,** the operator is responsible for accidents or hazards occurring to other people or their property.

WARNING

Specific safety warning decals are located on the equipment near the immediate areas of potential hazards. These decals should not be removed or obliterated. Replace them if they become non-readable.

The following illustrations show the various safety decals that are located on the mower. A brief explanation, for those requiring one, is shown to help the operator understand the meanings of these decals.

- **Read Operator's Manual and Safety Warning Decals before attempting to operate this machine.**

- **Do not smoke while refueling.**
- **Do not remove the fuel tank cap or fill tank with engine running or while the engine is hot.**
- **Allow engine to cool before storing machine inside a building.**
- **Store away from open flame or spark if there is fuel in tank.**
- **Clean up any gasoline spills.**
- **Do not refuel while in enclosed trailer or other enclosed areas.**
- **Maximum of 10% ethanol (E10) in fuel. Fuels with greater than 10% ethanol, (such as E15, E20 and E85) voids warranty. Fuels with greater than 10% ethanol are not approved for use and such illegal use could cause equipment failure and pose a fire hazard.**

Part Number 602041

WARNING:
Hot surface!

- **Keep a safe distance from the machine.**

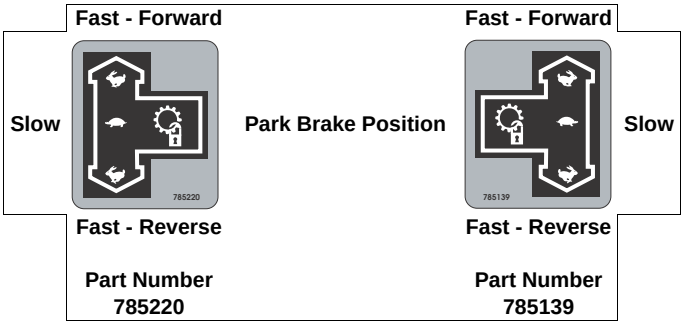
Part Number 600899

- **If you loose steering control while operating the machine, place the steering control levers in the park brake position immediately. Inspect the machine and involve your dealer to resolve the problem before continuing to operate.**
- **If pump belt fails, steering control will be lost. Refer to owner's manual for inspection and replacement intervals and refer to above paragraph for emergency procedures.**

WARNING: Fire!

Part Number 601967

- **Clean flammable material from machine. Prevent fires by keeping engine compartment, top of deck, exhaust area, battery, fuel line, fuel tank and operator's station clean of accumulated trash, grass clippings, and other debris. Always clean up spilled fuel and oil.**



Part Number 785220

Part Number 785139

WARNING:Thrown objects!

- **Always maintain a safe distance from people and pets when mowing.**
- **Always stop machine if someone enters the area.**
- **Inspect area to be mowed for hazards such as rocks, metal objects and other debris which may be thrown or entangled by mower blades. Remove these objects before mowing.**

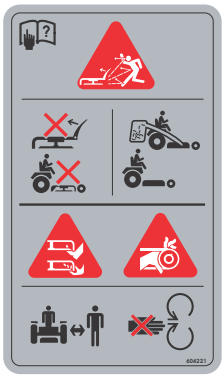
Part Number 604222

DANGER:
Rotating blades, pulleys & belts

- **Keep shields and covers in place while machine is in operation**
- **Keep hands, feet and clothing away from rotating pulleys and belts.**

WARNING:Thrown objects!

- **Never operate the mower deck with side deflector damaged, altered, removed or in raised position, except when the entire grass catcher attachment or mulching system is being used.**



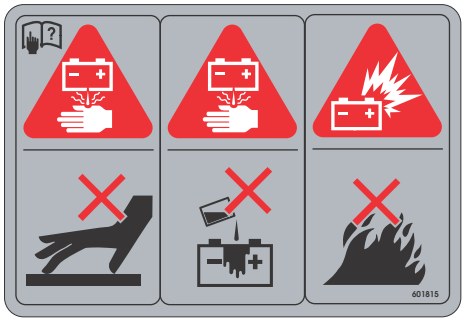
Part Number 604221

DANGER:
Rotating blades, pulleys & belts

- **Keep shields and covers in place while machine is in operation**
- **Keep hands, feet and clothing away from rotating pulleys and belts.**

DANGER: Battery Hazards!

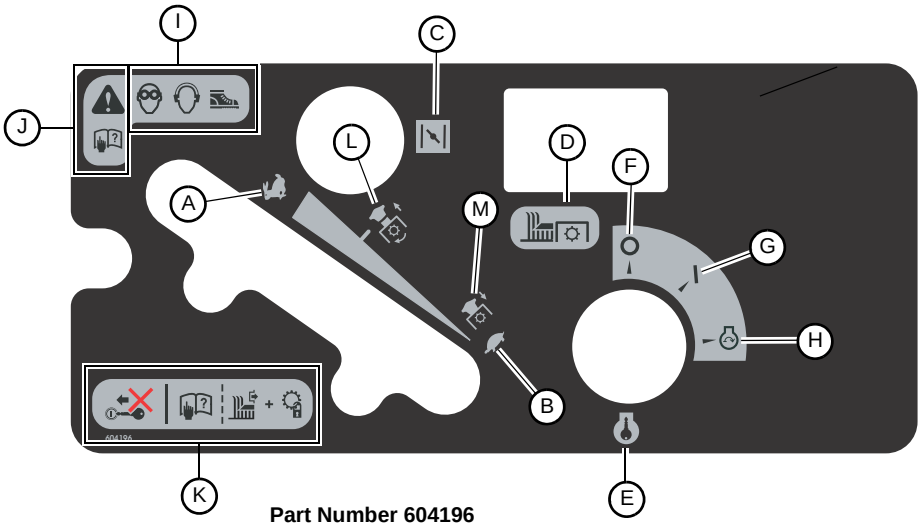
Part Number 601815



- **Avoid skin contact with battery acid**

- **Do not overfill battery.**
- **Electrolyte may overflow and damage paint, wiring or structure. When cleaning the battery, use soap and water. Be careful not to get soap and water into the battery. Use soda mixed in water to clean corrosion off the terminals.**
- **Always wear eye protection when checking the battery, acid can cause serious injury to skin and eyes. If contact occurs, flush area with clean water and call physician immediately. Acid will also damage clothing.**

- **Do not allow open flame near the battery when charging.**
- **Hydrogen gas forms inside the battery. This gas is both toxic and flammable and may cause an explosion if exposed to flame. Always remove the negative ground first and replace it last.**



Part Number 604196

A. Fast
B. Slow
C. Choke
D. Mower blade engage/disengage switch
E. Ignition switch - insert key
F. OFF
G. ON
H. Engine start position
I. Wear ear protection, eye protection and safety shoes when operating this equipment.
J. Read Operator's Manual before attempting to operate this machine.
K. Before starting the engine:
- Read Owner's Manual
- Disengage mower blades
- Place control levers in park brake position

L. For maximum electric clutch life engage at 1/2 - 3/4 throttle position.
M. For maximum electric clutch life disengage at low throttle position.

Part Number 601981

WARNING: Read Operator's Manual and decals before attempting to operate this machine.

WARNING: Roll over!

- **Mow a safe distance (minimum of 10 feet) away from drop-offs, retaining walls, drainage ditches, embankments, water, and other types of hazards to avoid a wheel dropping over the edge or to avoid the ground from breaking away.**

WARNING: Back over!

- **Do not carry passengers.**
- **Always stop machine if someone enters the area.**
- **Always be aware of what is behind the machine before backing up. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing up.**

WARNING: Roll over!

- **Slow down before turning.**
- **Do not operate on slopes greater than 15 degrees.**
- **Keep all movement on slopes slow and gradual. Never make sudden changes in speed and direction.**
- **Do not mow on slopes above a retaining wall or drop-off.**

WARNING: Ejection!

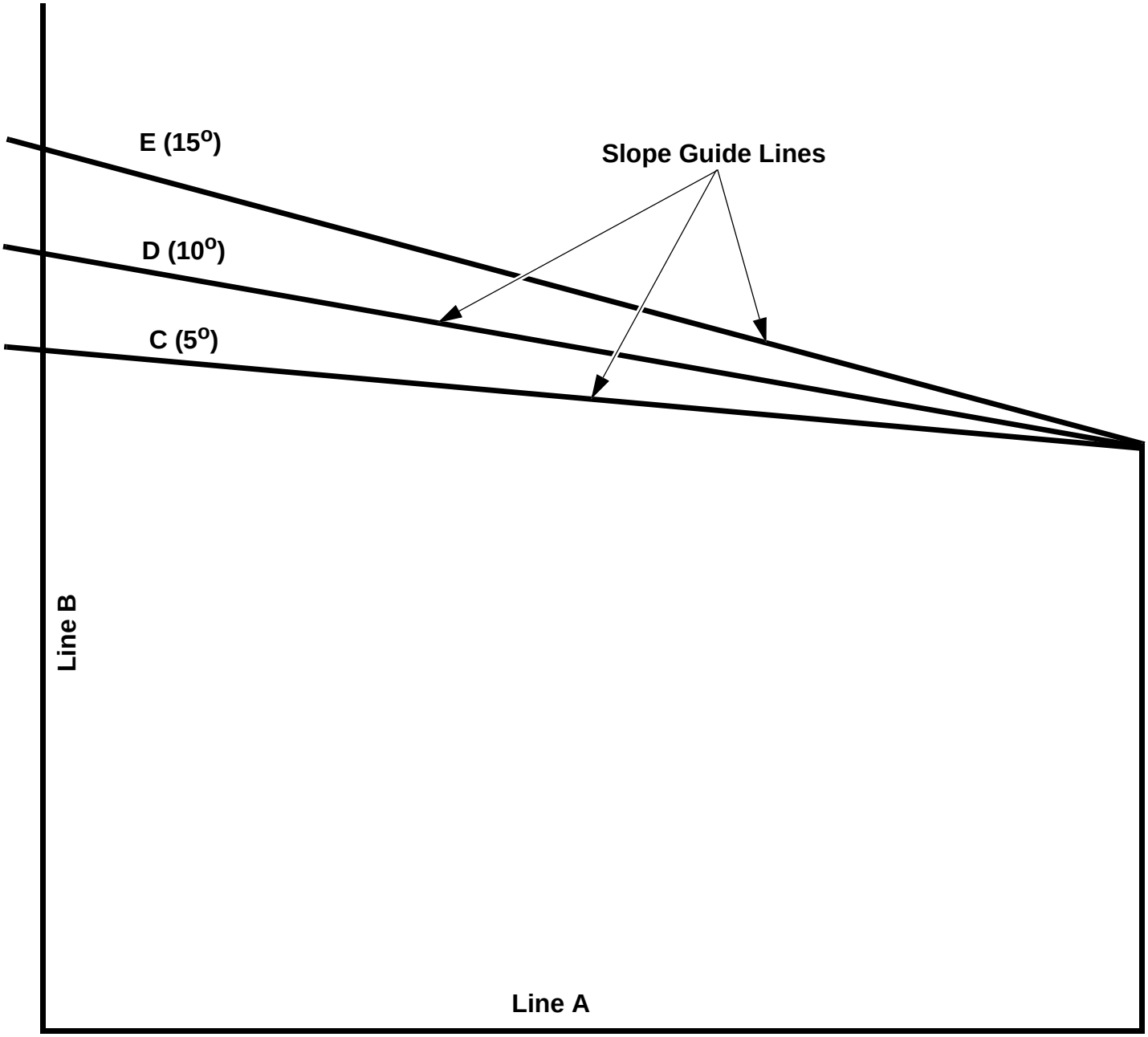
- **Do not operate on slopes greater than 15 degrees.**
- **Keep all movement slow and gradual when going up or down slopes.**
- **Do not remove or modify stabilizer wheels or injury can result.**

WARNING: Loss of traction/control on slopes!

- **Shut off blades.**
- **Back slowly down the slope when loss of traction occurs.**

Slope Guide

Use this diagram when determining the degree of slope to be mowed.



1. Hold this sheet of paper in front of you. Make sure that Line A is horizontal.
2. Align Line B with a vertical surface such as pole, tree or building.
3. Fold the paper along the slope guide lines (C, D or E).
4. Align the closest slope guide line with the ground slope. This will give you a close estimation of the ground slope to be mowed.

OPERATION

Safe Operating Practices

This product is capable of amputating hands and feet and throwing objects. Always follow all safety instructions to avoid serious injury or death.

Safe Operation

- ▲ Evaluate the terrain to determine what accessories and attachments are needed to properly and safely perform the job. Only use accessories and attachments approved by the manufacturer.
- ▲ Never leave a running mower unattended. Always stop on level ground, disengage deck clutch, place steering control levers in park brake position, stop the engine, and remove ignition key before leaving operator's seat for any reason. Wait for engine and all moving parts to come to a complete stop before leaving the mower for any reason including emptying the catcher or unclogging the chute.
- ▲ Do not change the engine governor setting or overspeed the engine. Operating the engine at excessive speed may increase the hazard of personal injury.
- ▲ Always remain seated while operating mower.
- ▲ Always keep safety shields and covers in place, except for servicing.
- ▲ Always maintain a safe distance from people and pets when mowing. Always stop mower if someone enters the area.
- ▲ Always operate mower in daylight or with adequate working lights.
- ▲ Follow daily and weekly checklists, making sure hoses are tightly secured and bolts are tightened.
- ▲ Always observe traffic laws while driving mower from one location to another. Watch for traffic when operating near or crossing roadways.
- ▲ Always be alert for hazards such as rocks, metal objects and other debris which may be thrown or entangled by mower blades. Watch out for holes or deep depressions.
- ▲ Never operate the mower when there is a risk for lightning.
- ▲ Inspect area to be mowed for hazards such as rocks, metal objects and other debris which may be thrown or entangled by mower blades. Remove these objects before mowing.
- ▲ Always inspect mower for damage after striking a foreign object. If damage is found, repair mower immediately. **Be sure to stop on level ground,** disengage deck clutch, set park brake, stop the engine, and remove the ignition switch key when leaving the operator's seat to inspect damage.
- ▲ Always wear adequate ear protection, such as earplugs, when operating this equipment as prolonged exposure to uncomfortable or loud noises can cause impairment or loss of hearing. Do not wear radios or music headphones while operating the machinery. Safe operation requires your full attention.
- ▲ Do not operate the equipment while wearing sandals, tennis shoes, sneakers, shorts or any type of loose fitting clothing. Do not use a towel as a headband or neck wrap and do not hang a towel from the waist. Long hair, loose clothing or jewelry may get tangled in moving parts. Always wear long pants, safety glasses, ear protection and safety shoes with slip-resistant soles when operating this mower.
- ▲ Always be aware of what is behind the mower before backing up. Never mow in reverse. Always look down and behind before and while backing up.
- ▲ Never push forward suddenly on your steering control levers while the mower is in rearward motion because mower may tip backwards.
- ▲ Never pull back suddenly on your steering control levers while the mower is in forward motion.
- ▲ When mowing in reverse, push forward slowly on the steering control levers and avoid sudden movement. Rapid movement of the steering control levers in either direction could result in a reaction of the mower that can cause serious injury.
- ▲ Never operate a poorly maintained mower.
- ▲ Never attempt high speed maneuvering, especially in crowded or congested areas.
- ▲ Never allow persons to operate this mower without proper instruction or allow children to operate mower. Allow only responsible adults who are familiar with these instructions to operate this mower.
- ▲ Never put hands or feet under any part of the mower while it is running.
- ▲ Never carry passengers.
- ▲ Never direct discharged material toward anyone. Avoid discharging material against a wall or obstruction. Material may ricochet back towards the operator. Always disengage the mower blades and wait for them to stop before crossing gravel drives, walks or roads.
- ▲ Always keep clear of the mower blades and attachments during their operation.
- ▲ Do not use any unauthorized attachment or modify the mower.
- ▲ Turn off mower blades when not mowing.
- ▲ Slow down before turning.
- ▲ Stop the engine before removing the grass catcher or unclogging the discharge chute. Never clear the discharge chute with the engine running. Turn off the engine and be sure the blades have stopped before cleaning. Use a stick to clear a plugged discharge area. **Never use your hand!**
- ▲ Do not operate the mower if you are fatigued, sick or while under the influence of alcohol or drugs, if your are pregnant or under 18 years old.
- ▲ Poor posture or operating the mower for extended periods of time may lead to fatigue or injury, resulting in loss of mower control. Occasionally, stop the mower and get off the seat to stretch and relax.
- ▲ Exercise extreme caution when loading or unloading the mower onto a trailer or truck.

- ▲ Always wear safety goggles or safety glasses with side shields when operating the mower.
- ▲ Data indicates that operators, age 60 years and above, are involved in a large percentage of riding mower-related injuries. These operators should evaluate their ability to operate the mower safely enough to protect themselves and others from serious injury.
- ▲ Follow the manufacturer's recommendation for wheel weights or counterweights.
- ▲ If any attachment or additional weight is mounted on the rear of the unit, any rapid movement of the control levers in either direction could result in a reaction of the mower that can cause serious injury.
- ▲ **Clean flammable material from mower. Prevent fires by keeping engine compartment, top of deck, exhaust area, battery, fuel line, fuel tank and operator's station clean of accumulated trash, grass clippings, and other debris. Always clean up spilled fuel and oil.**
- ▲ **Prevent fires by keeping the engine and exhaust areas clear of grass clippings and other debris. Do not back mower into flammable materials.**

Using A Ramp

- ▲ Use extreme caution when loading and unloading a mower onto a truck or trailer with a ramp.
- ▲ Use only a single, full width ramp; do not use individual ramps for each side of the unit. Having a full width ramp provides a surface for the mower frame to contact if the unit starts to tip backwards. It also reduces the risk of a wheel going off and the mower tipping over.
- ▲ Do not exceed a 15 degree angle between the ramp and the ground or between the ramp and the trailer or truck.
- ▲ Avoid sudden acceleration when on a ramp.

Slope Operation

Slopes are a major factor in loss-of-control and tip-over accidents, which can result in severe injury or death. All slopes require extra caution. If you cannot back the mower up the slope or if you feel uneasy on the slope; do not mow it. REMINDER: Only operate on slopes of 15 degrees or less.

- ▲ Use extreme caution when operating on slopes.
  - Be extremely careful changing directions on a slope. Slow down.
  - Do not operate where the mower could slip or tip.
  - Turn slowly
  - Turn on the most level part of the slope
  - To maximize traction, it is better to turn the front of the mower uphill, rather than downhill. **If drive tires lose traction, steering control is lost which could cause serious injury or death.**
  - If it becomes necessary to turn downhill, turn slowly and gradually, if possible.
- ▲ Watch for holes, ruts, bumps, rocks or other hidden objects. Uneven terrain could overturn the mower. Tall grass can hide obstacles.
- ▲ Remove obstacles such as rocks, tree limbs, etc.
- ▲ Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction.
- ▲ Avoid starting and stopping on a slope. If tires lose traction, disengage the mower blades and proceed slowly straight down the slope.
- ▲ Mow a safe distance (minimum of 10 feet) away from drop-offs, retaining walls, drainage ditches, embankments, water, and other types of hazards to avoid a wheel dropping over the edge or to avoid the ground from breaking away. This will reduce the risk of the mower suddenly rolling over causing serious injury or death.
- ▲ Use a walk behind, push mower or hand-held trimmer on slopes and near drop-offs, retaining walls, drainage ditches, embankments and water to avoid mower rollover and serious injury or death.
- ▲ Do not mow on wet grass. Slippery conditions reduce traction which could cause sliding and loss of control.
- ▲ Do not tow on slopes. The weight of the towed equipment may cause loss of traction and loss of control.
- ▲ Do not try to stabilize the mower by putting your foot on the ground.
- ▲ If the mower's tires lose traction when operating on slopes, disengage the blades, place the control levers in the park brake position, stop the engine, remove ignition switch key, and get help.
- ▲ Never make sudden starts, stops, turns, or reverse direction, especially when maneuvering on slopes. The steering is designed for sensitive response. Rapid movement of the control levers in either direction could result in a reaction of the mower that can cause serious injury.
- ▲ Never stop suddenly while backing down slopes. This action may result in a reaction of the mower that can cause serious physical injury.
- ▲ The Hustler® mower is capable of operating horizontally (traverse) on moderately steep slopes. When operating on slopes up to 15 degrees, be aware of any conditions that may cause the mower drive tires to lose traction resulting in a possible loss of control of the mower. An operator should not operate on a slope until he is thoroughly familiar with the equipment.

  Do not operate on slopes greater than 15 degrees.

  Refer to the *Slope Guide*, when determining the degree of slope to be mowed.

  It is strongly recommended that the operator drive the mower off of the slope, using extreme caution, if any sign of loss of traction is detected. Wait until the condition that caused the problem is resolved before attempting to operate on the slope again.

  Terrain conditions can affect traction resulting in possible loss of control of the mower. Some of the conditions to be aware of are:

  1. Wet terrain
  2. Depressions in the ground; i.e. holes, ruts, washouts
  3. Mounds of dirt
  4. Soil type; i.e. sand, loose dirt, gravel, clay
  5. Grass type, density, and height
  6. Extremely dry conditions of grass
  7. Tire pressure

  The attachments mounted to the mower will also affect the way it handles on a slope. Be aware that each attachment's characteristics vary.

Do not tow on slopes. The weight of the towed equipment may cause loss of traction and loss of steering control.

Another consideration to safe mowing on slopes is to be aware of what is located at the bottom of the slope. Extreme caution should be used when there is a hazard located at the bottom of the slope. Some examples are:

1. Water; i.e. lake, river
2. Cliffs, retaining walls
3. Roads, highways
4. Buildings
5. Rocks

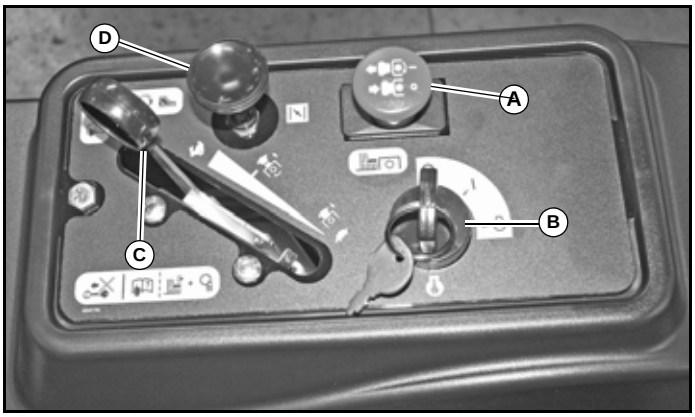
These are just a few examples of situations when caution must be used when operating on a slope. There are many other possibilities too numerous to mention. Just remember to always exercise extreme caution when operating on any slope.

Children

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the mower and the mowing activity. Never assume that children will remain where you last saw them.

- ▲ Never leave the mower unattended with the ignition key in switch, especially with children present.
- ▲ Children or bystanders may be injured if they move or attempt to operate the mower while it is unattended. Always disengage the deck clutch, place the control levers in park brake position, stop the engine, and remove the ignition key when leaving operator's seat.
- ▲ Keep children out of the mowing area and under the watchful care of a responsible adult other than the operator.
- ▲ Be alert and turn the mower off if children enter the area.
- ▲ Before and while backing, look behind and down for small children.
- ▲ Never carry children, even with the blades off. They may fall off and be seriously injured or interfere with safe mower operation. Children who have been given rides in the past may suddenly appear in the mowing area for another ride and be run over or backed over by the mower.
- ▲ Never allow children to operate the mower.
- ▲ Never allow children or others in or on towed equipment.
- ▲ Use care when approaching blind corners, shrubs, trees, the end of a fence or other objects that may obscure vision.

Control Panel



A. Deck clutch switch	**C.** Throttle
B. Ignition switch	**D.** Choke

Figure 3-1

IMPORTANT: When access is required under the seat platform and the seat is equipped with the optional arm rests, make certain to place the control arms in the park brake position and pivot the arm rests upward before placing the seat platform in the full forward position to prevent arm rest damage.

A. Deck clutch switch (Figure 3-1) — this switch engages the deck. Pull the switch up to engage and push switch down to disengage the clutch.
IMPORTANT: For additional clutch information refer to the *Mower deck operation* section of this manual.

B. Ignition switch (Figure 3-1) — a three position switch: "OFF", "RUN", and "START". With key inserted, rotate it clockwise to "START" position; release key when engine starts, and switch will automatically return to the RUN position.

C. Throttle control (Figure 3-1) — a cable is linked to the engine throttle for controlling engine speed. Move lever forward to increase engine rpm, move lever rearward to decrease engine rpm.

D. Choke control (Figure 3-1) — a cable is linked to manually operate the engine choke. When the lever is in the down position, the choke is in the "OFF" (run) position. When the knob is pulled up, the choke is in the "ON" (start) position. **Do not** operate the machine in the "ON" (start) position.

Controls

A. Steering control levers (Figure 3-2 & Figure 3-3) — these levers control the mower's speed, direction, stopping, and park brake. These levers are used to steer, accelerate, decelerate and change direction. When the steering control levers are in the park brake position the mower will not move when the engine is on and drive pumps are operating

WARNING

The parking brake may not hold the mower if parked on a slope. Block or chock the machine when parked on a slope.

B. Deck cutting height adjusting lever (Figure 3-4) — the deck cutting height adjusting lever is used to raise or lower the deck. Slide the lever out of a notch and raise or lower the lever and slide it into the desired cutting height notch.

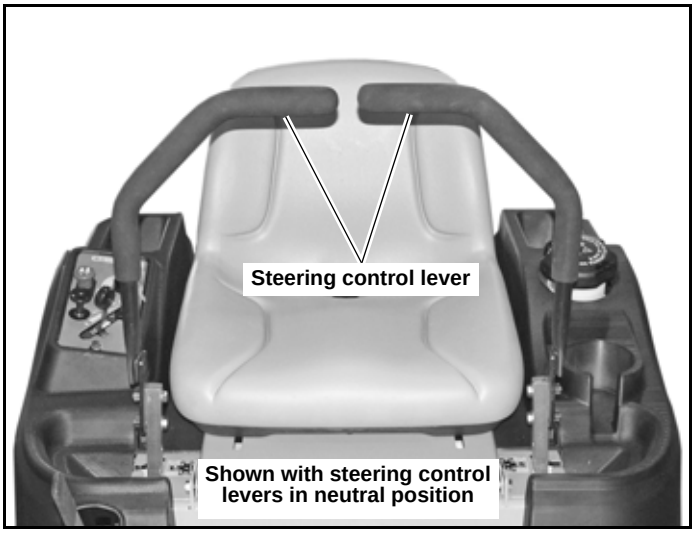


Figure 3-2

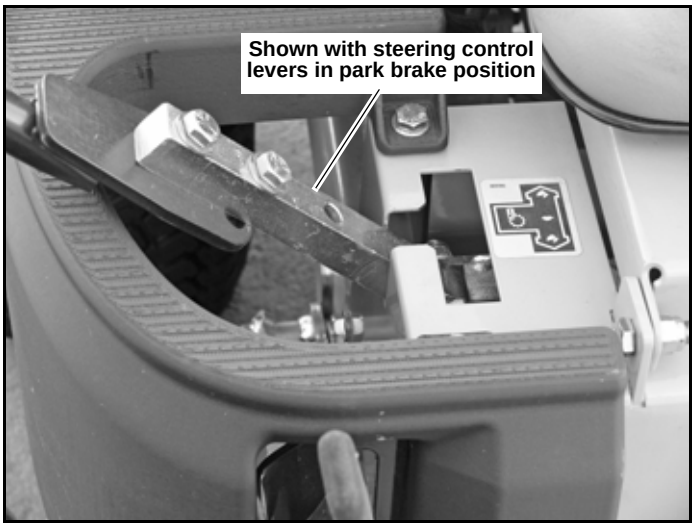


Figure 3-3

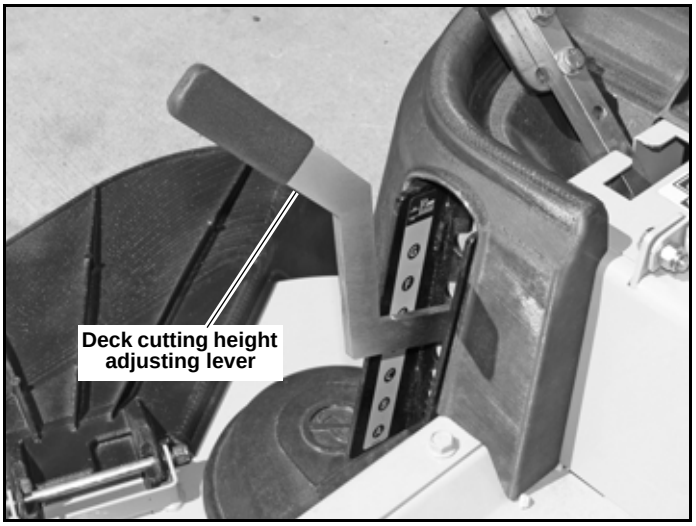


Figure 3-4

Safety Start Interlock System

The mower is equipped with a safety start interlock system consisting of the park brake switches, seat switch, and deck clutch switch.

Check the mower's safety start interlock system daily, prior to operation. This system is an important mower safety feature. It should be repaired immediately if it malfunctions. The machine incorporates a separate seat switch which will stop the engine when the operator is unseated for any reason while the mower is operating. This is a safety feature designed to prevent runaway or accidental entanglement. To inspect the system:

1. The operator must be on the seat when testing the seat switch.
2. Set both steering control levers in the park brake position.
3. Start the engine and allow it to warm up to operating temperature.
4. With the deck clutch switch down and the steering control levers in the park brake position, slowly raise off of the seat. **The engine should continue to run.**
5. With the deck clutch switch up and/or the steering control levers in the neutral position, slowly raise off of the seat. **The engine should stop.**
6. **If the engine fails to stop** when the deck clutch switch is up or one or both of the steering control levers is up and the operator is off the seat, check the function of the seat switch. If the seat switch is not operating properly **(is not opening or closing)** and if the cause can not be determined, replace the seat switch.
   If the problem cannot be located, contact your Hustler® Dealer.

WARNING

The safety interlock system should always function per steps 4 and 5. If it does not function properly, it should be corrected immediately. Do not operate machine without a properly functioning seat safety switch.

Engine Starting

The mower's safety start interlock system is also designed to protect the operator and others from accidental injury due to unintentional engine starting. The engine starting motor will not engage until:

1. Steering control levers are in the park brake position.
2. Deck clutch switch is in the down (OFF) position.

WARNING

The safety interlock system must not be disconnected or bypassed. Doing so could cause the machine to operate unexpectedly resulting in personal injury.

NOTE: The operator's seat is equipped with a separate safety switch. If for any reason the operator should become unseated when the steering control levers are not in the park brake position (park brake switches are disengaged) or the deck clutch switch is engaged the engine will stop.

The following steps are the correct procedures for starting the engine. If difficulty is encountered, contact the Hustler® Dealer in your area.

1. Before starting mower each day, perform daily pre-operation checking. (See *Safety Start Interlock System* section.)
2. Make sure the steering control levers are in the park brake position and deck clutch switch is disengaged. Only start the engine from the operator's position.
3. Use choke when engine is cold, or if warm engine fails to start within 5 seconds of cranking. Avoid flooding and operate engine without choking as soon as possible.
4. Set throttle at approximately 1/2 open position.
5. Insert key in ignition switch and rotate full clockwise to engage starting motor. Release key when engine starts.
   IMPORTANT: The engine starter should not be operated for periods longer than 30 seconds at a time. An interval of at least two minutes should be allowed between such cranking periods to protect the starter from overheating and burn-out.
6. Perform test to make sure safety start interlock system is operating properly. Refer to *Safety Start Interlock System* section.
7. Allow the engine to idle a few minutes before advancing the throttle and/or engaging the deck clutch.

Stopping The Engine

Use the following procedure to shut off the engine after operating the equipment.

1. Place the steering control levers in the park brake position.
2. Throttle the engine back to low idle, then disengage the deck clutch. Refer to *Mower deck operation* section for more details.
3. Let the engine run at low idle for a couple of minutes.
4. Rotate the ignition key counter-clockwise to the "OFF" position. Remove the key from switch before leaving the mower.

Moving Mower With Stalled Engine

If it becomes necessary to move the mower when the engine is inoperative, the transaxles are equipped with bypass valves.

Before moving the unit, pull out on the bypass valve rod until the notch in the rod hooks over the edge of the slot. This places the bypass valves in the disengaged position. The valve rod is located per Figure 3-5.

The steering control levers must be placed in the neutral position, to release the park brakes, so that the mower can be moved.

Do not tow the machine. Move it by hand or use a winch to load on a trailer for transporting.

When transporting on another vehicle, the mower should be facing forward and it must be secured.

IMPORTANT: Always make certain the two bypass valves are returned to their operating position before running the mower following repairs.

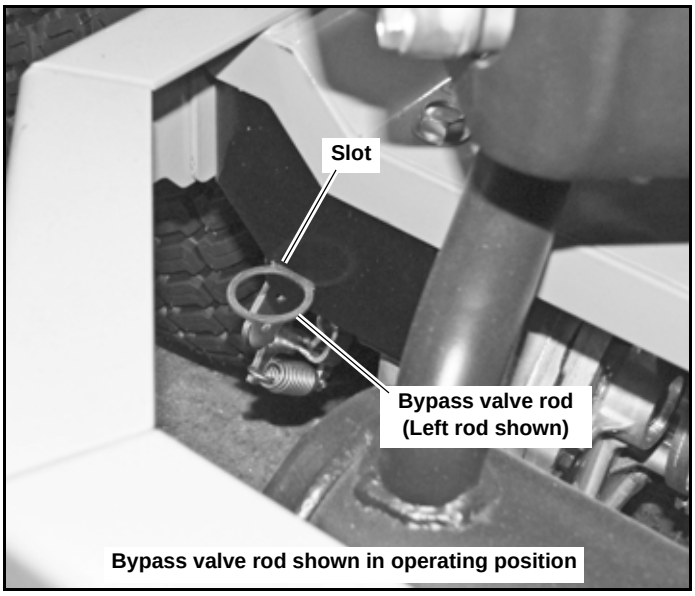


Figure 3-5

WARNING

Allow engine exhaust manifold to cool before engaging or disengaging the bypass valves. The bypass valve rods are located close to the exhaust system.

Mower Operation

This mower is equipped with the SmoothTrak™ steering system. The following provides you with detailed information on how to operate the mower efficiently.

Driving the mower

DANGER

Never make sudden stops or reverse direction, especially when maneuvering on a slope. The steering is designed for sensitive response. Rapid movement of the control levers in either direction could result in a reaction of the mower that can cause serious injury.

After starting engine, engage the steering control levers and steer as follows:

To go forward, push steering control levers forward an equal distance (Figure 3-6).

To go in reverse, pull steering control levers rearward an equal distance (Figure 3-6).

To turn left, move the right steering control lever farther forward from neutral than the left steering control lever.

To turn right, move the left steering control lever farther forward from neutral than the right steering control lever. (Figure 3-6)

Zero radius turn, move one steering control lever forward and the other steering control lever back of neutral. This will allow the drive wheels to counter-rotate. (Figure 3-6)

To stop or decrease speed, move steering control levers to neutral. When going forward pull back gently on steering control levers. When going in reverse push forward gently on steering control levers.

For emergency stop, when traveling forward or rearward, place the steering control levers in the park brake position immediately.

DANGER

When moving in the rearward direction push forward gently on steering control levers and avoid sudden movement. Any sudden movement could cause the front of the mower to come off of the ground resulting in possible loss of control, causing serious injury or death.

To make a three point turn to the right, move the left steering control lever farther forward from neutral than the right steering control lever and start the turn. Next, pull back on the steering control levers until they are past neutral and the machine starts to go rearward. Pull the right steering control lever farther rearward from neutral than the left steering control lever until the rear of the machine has pivoted around. Then, push the steering control levers forward until they are both past neutral and the machine starts to go forward. Push the left steering control lever farther forward from neutral than the right

steering control lever and finish the turn. (Figure 3-7)

WARNING

Always be aware of what is behind the machine before backing up. Do not mow in reverse unless absolutely necessary. Always look down and behind before and while backing up.

IMPORTANT: Rapid movement of steering control levers is not recommended as damage to the hydraulic system components may occur.

To increase speed, increase steering control lever's distance from neutral. The farther forward steering control levers are from neutral, the faster the mower will travel forward. The farther back steering control levers are from neutral, the faster the mower will go in reverse.

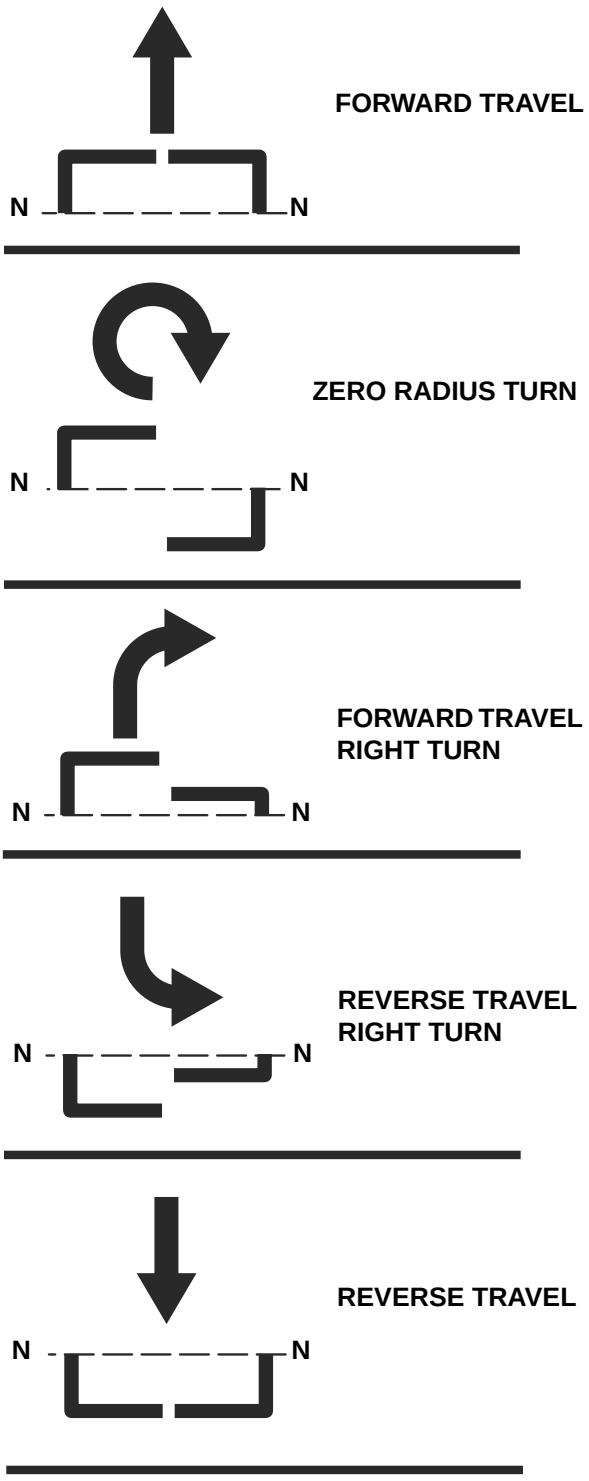


Figure 3-6

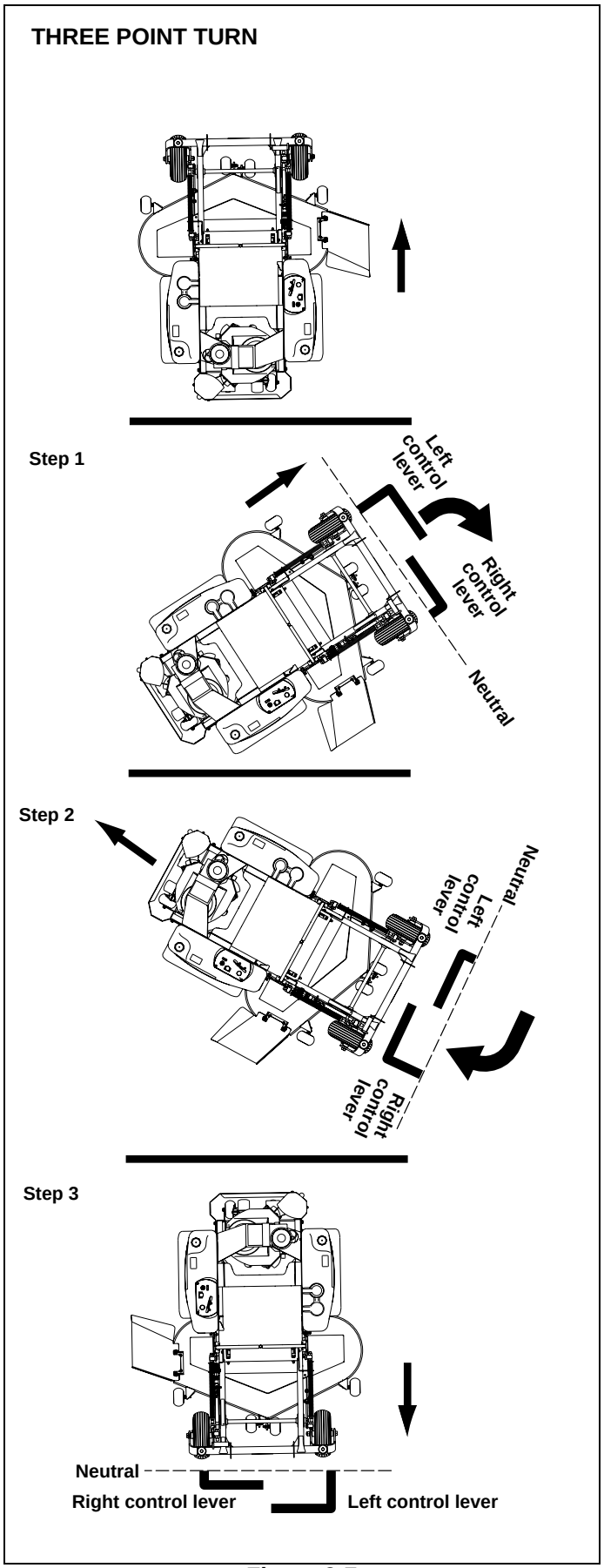


Figure 3-7

Operating suggestions

DANGER

Prior to operating the mower the operator should be thoroughly familiar with the proper use and operation of the equipment, should read the manual completely and thoroughly, and should have attempted slow moving maneuvers to become familiar with the operation of the equipment before attempting normal speed operation. An inexperienced operator should not mow on slopes or on uneven terrain.

WARNING

If you lose steering control while operating the machine, place the steering control levers in the park brake position immediately. Inspect the machine and involve your Hustler® Dealer to resolve the problem before continuing to operate.

WARNING

The unit's steering control levers are very responsive: **Easy does it!** For smooth operation, move the levers slowly, avoiding sudden movement. Skill and ease of operation come with practice and experience. The machine can spin very rapidly. Use caution when making turns and slow down before making sharp turns.

Inexperienced operators may have a tendency to oversteer and lose control. Slow-moving (low engine rpm - idle) practice maneuvers on a flat open area are recommended to become familiar with these characteristics before attempting normal speed operation.

WARNING

Sharp depressions or raised obstacles (such as gutters or curbs) should not be directly approached at high speed in an attempt to "jump" them as the operator could be thrown from the equipment. Approach at a slow speed and angle one drive wheel at the obstruction. Continue at an angle until the wheel clears and then pivot the opposite wheel around.

When turning on soft wet turf, keep both wheels rolling either forward or backward. Pivoting on one stopped wheel can damage turf. This is especially important when mowing.

Mower performance is at maximum when the throttle is set at full rpm. This gives maximum power to the drive wheels and deck when needed. Use the control levers to control ground speed rather than engine rpm.

Keep blades sharp. Many professional mowing companies

have additional sets of blades and change blades twice a day: once in the morning and again at noon. **Many problems** with incorrect cutting patterns are **due to dull blades** or blades which have been **sharpened incorrectly.** Information on sharpening blades is listed in this manual's maintenance section. In addition, most communities have individuals or companies which specialize in sharpening mower blades. **Blade sharpness should be checked daily.**

DANGER

Never work with blades while engine is running or deck clutch switch is engaged (on). Always place deck clutch switch in the disengaged position, place steering control levers in the park brake position and turn engine off and disconnect negative battery cable. Block up mower when you must work under it. Wear gloves when handling blades. Always check for blade damage if the mower strikes a rock, branch or other foreign object during mowing!

Use high blade speed. Your mower is designed to operate at full throttle. The throttle setting directly controls blade speed. The highest blade speed generally gives the best cut.

Direct grass discharge to the right, away from the unmowed area. Select a mowing pattern that directs grass discharge toward the outside, not toward the center, of the mowing area. Generally, this means using a pattern utilizing **left turns** because side discharge is to the **right.** In any case, avoid throwing grass discharge onto unmowed area because grass is then mowed "twice". Mowing twice puts an unnecessary load on the unit and reduces mowing efficiency.

When mowing a lawn for the first time cut grass slightly longer than normal to avoid scalping uneven terrain. When possible, it is best to use the cutting height that was used in the past. When cutting grass taller than six inches, you may want to mow the lawn twice to achieve a better quality of cut.

During normal mowing cut only about 1/3 of the grass blade. Cutting more than that is not recommended unless grass is sparse or it is the end of the mowing season.

Alternate the mowing direction to keep the grass growing straight and for better dispersion of the clippings.

Remember, grass grows at different rates at different times of the year. Mow more often in the early spring to maintain the same cutting height. As the growth rate slows in midsummer, mow less frequently. If you cannot mow at a regular interval, mow at a high cutting height; then mow again two days later at a lower cutting height.

Raise the cutting height of the mower if the cutting width of the mower is wider than the previous mower. This ensures that uneven turf is not cut too short.

Raise the cutting height of the mower if the grass if slightly taller than normal or if it contains a high degree of moisture. Then mow it again with the cutting height set lower.

If the machine's forward motion must be stopped while mowing, a clump of grass clippings may drop onto your lawn. To avoid this, move onto a previously cut area with the blades engaged.

WARNING

Never direct the discharge of material from the mower deck toward bystanders. Do not operate the mower without either the discharge chute or the entire grass collection system in place. Figure 3-8

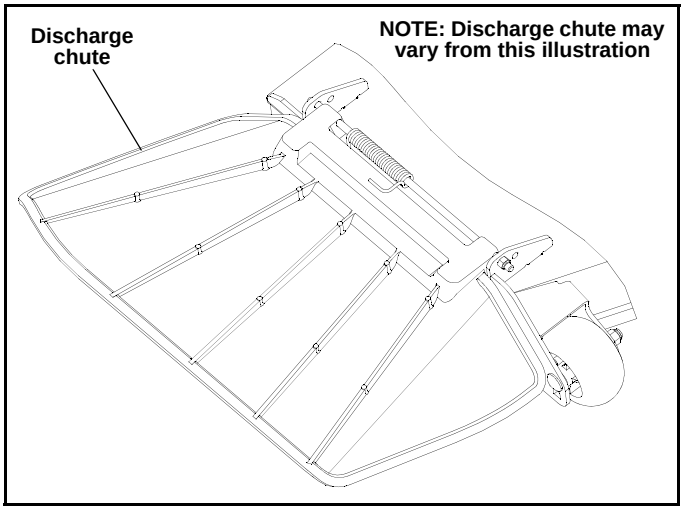


Figure 3-8

DANGER

Never attempt to make any adjustments to the mower deck while the engine is running or with the deck drive clutch engaged. Mower blades cannot be seen and are located very close to deck housing. Fingers and toes can be cut off instantly.

Deck clutch operation

Before beginning operation, check to make sure the deck clutch switch is engaging and disengaging the blades properly.

WARNING

Make sure that the area around and under the deck is clear and that there are no bystanders in the immediate area before proceeding.

To check the deck clutch switch:

1. Start the engine and engage the deck clutch.
2. With the deck clutch switch up (clutch engaged) and the engine running, listen to confirm that the mower blades are rotating.
3. Now, push the deck clutch switch down (clutch disengaged), and with the engine running, listen to confirm that the blades have stopped rotating.
4. If the mower blades continue to rotate with the deck clutch switch down, discontinue operation immediately and contact your Hustler® Dealer.

Clutch life will be maximized if these procedures are followed.

1. **Engage the clutch** only when the throttle is set at approximately **2/3 throttle** and there is **no load** on the blades. After clutch engagement, advance the engine throttle to full rpm.
   Engaging the deck clutch at high engine rpm or when under heavy load (in tall grass, for example) can cause belts and/or electric clutch to slip, resulting in premature wear or possible damage.
2. **Disengage the clutch** only when the throttle is set at **less than 1/2 throttle.**
   Never disengage the clutch with the engine running at high rpm. Setting the throttle to less than 1/2 throttle when disengaging the clutch will help extend clutch life.

Warranty will not be allowed for deck clutches that fail due to improper engagement and disengagement practices.

Deck Cutting Height Adjustment

The deck height is adjustable in 1/2" (6.4mm) increments.

When the deck cutting height adjusting lever is in the "A" slot, the deck mowing height is set at its lowest mowing position. When the lever is located in the "G" slot, the deck height is at its highest mowing position or transport mode.

To adjust the cutting height, slide the deck cutting height adjusting lever out of the notch that it is in and raise or lower it until the desired cutting height is achieved and slide the lever into that notch. Figure 3-9

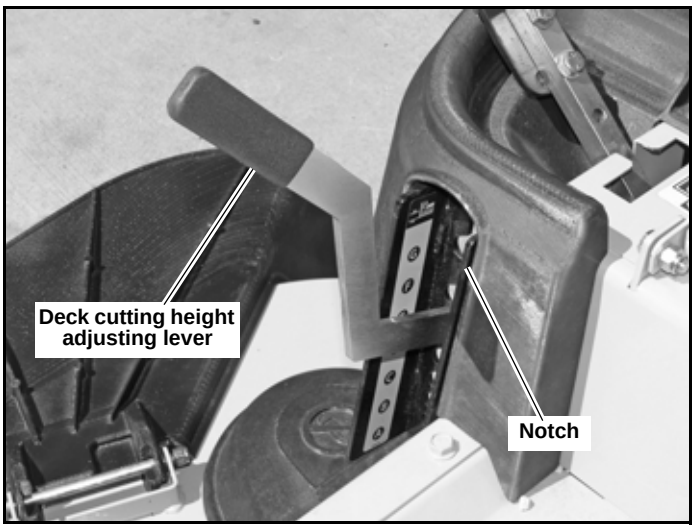


Figure 3-9

Anti-Scalp Wheels

Anti-scalp wheels are standard on Raptor® mowers. These anti-scalp wheels are designed to minimize scalping when mowing on rough uneven terrain. Figure 3-10

Anti-scalp wheels can be installed in two positions. With the wheel installed in the bottom hole, the wheel is located 1.60" (40.6mm) below the mower blades. This setting is preferred when mowing at cutting heights of 2-1/2" (63.5mm) or higher. When the wheel is mounted in the top hole, it is located .70" (17.8mm) below the mower blades. This is the acceptable setting for mowing at cutting heights of 1-1/2" (38.1mm) or higher

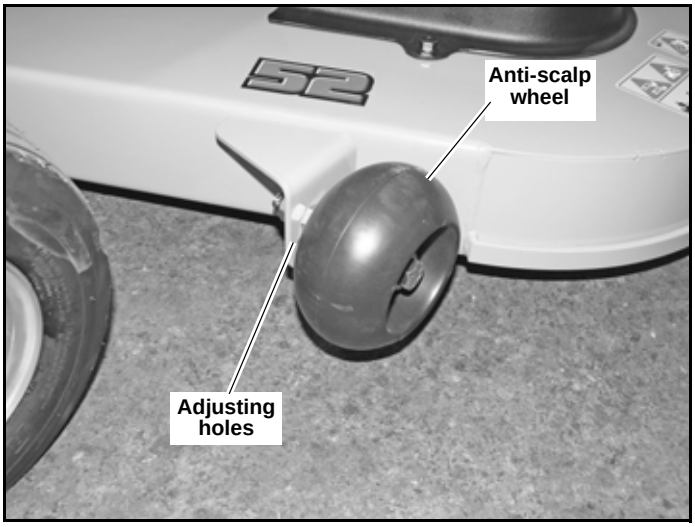


Figure 3-10

MAINTENANCE & ADJUSTMENTS

Safe Servicing Practices

This product is capable of amputating hands and feet and throwing objects. Always follow all safety instructions to avoid serious injury or death.

Service Precautions

- ▲ Unless specifically required, **DO NOT** have engine running when servicing or making adjustments to mower. Park the machine on level ground. Place steering control levers in the park brake position, disengage deck clutch, lower deck, remove ignition switch key and disconnect negative battery cable before doing any maintenance. Wait for all movement to stop before adjusting, cleaning or repairing. Repairs or maintenance requiring engine power should be performed by trained maintenance personnel only. To prevent carbon monoxide poisoning, be sure proper ventilation is available when engine must be operated in an enclosed area. Read and observe safety warnings in front of manual.
- ▲ Before working on or under the deck, make certain engine cannot be accidentally started. Shut engine off, remove ignition switch key and disconnect negative battery cable for maximum safety. Repairs or maintenance requiring engine power should be performed by trained maintenance personnel only.
- ▲ Except when changing or checking the belt, **always** keep belt covers on mower deck for safety as well as for cleanliness.
- ▲ Use a stick or similar instrument to clean under the mower making sure that no part of the body, especially arms and hands are under the mower.
- ▲ Keep your machine clean and remove any deposits of trash and clippings, which can cause engine fires and hydraulic overheating as well as excessive belt wear. Clean up oil or fuel spillage. Allow machine to cool before storing.
- ▲ **Clean flammable material from machine. Prevent fires by keeping the engine compartment, top of the deck, exhaust area, battery, fuel line, fuel tank and operator's station clean of accumulated trash, grass clippings, and other debris. Always clean up spilled fuel and oil.**
- ▲ Always wear adequate eye protection when servicing the hydraulic system and battery, or when grinding mower blades and removing accumulated debris.
- ▲ Use extra caution when handling gasoline and other fuels. They are flammable and vapors are explosive.
- ▲ Never attempt to start the engine when there is a strong odor of gasoline fumes present. Locate and correct the cause.
- ▲ Never remove the fuel cap or refuel the mower while engine is running or while engine is hot; never refuel near an open flame or near devices which can create a spark. Refuel outdoors. Never refuel or drain the fuel from the machine indoors.
- ▲ Never run the engine in an enclosed area unless exhaust is vented to the outside. Exhaust gases contain carbon monoxide which is an odorless and deadly poison.
- ▲ Never attempt to make any adjustments or repairs to the mower drive system, mower deck or any attachment while the mower engine is running or deck clutch is engaged. Repairs or maintenance requiring engine power should be performed by trained maintenance personnel only.
- ▲ Never work under the machine or attachment unless it is safely supported with jack stands. Make certain machine is secure when it is raised and placed on the jack stands. The jack stands should not allow the machine to move when the engine is running and the drive wheels are rotating. **Use only certified jack stands.** Use only appropriate jack stands, with a minimum weight rating of 2000 pounds (907 kg) to block the unit up. Use in pairs only. Follow the instructions supplied with the vehicle stands.
- ▲ Exercise caution when releasing spring tension from any of the belt idlers or when working with any of the deck lift components.
- ▲ Do not touch hot parts of machine.
- ▲ Keep nuts and bolts tight, especially the blade attachment bolts. Keep equipment in good working condition.
- ▲ Never tamper with safety devices. Check their proper operation regularly.
- ▲ Stop the engine before removing the grass catcher or unclogging the discharge chute. Never clear the discharge chute with the engine running. Turn off the engine and be sure the blades have stopped before cleaning. Use a stick to clear a plugged discharge area. **Never use your hand!**
- ▲ Grass collection system components are subject to wear, damage and deterioration, which could expose moving parts or allow objects to be thrown. Frequently check components and replace with manufacturer's recommended parts, when necessary.
- ▲ Exercise caution when working under the deck as the mower blades are extremely sharp. Wrap the blade(s) or wear gloves and use extra caution when servicing them.
- ▲ Use only genuine Hustler® replacement parts to ensure that original standards are maintained.

Service Introduction

Regular maintenance is the best prevention for costly downtime or expensive, premature repair. The following pages contain suggested maintenance information and schedules which the operator should follow on a routine basis. For more detailed information order the correct Parts Manual and General Service Manual for your unit. Refer to the *Product Literature* section of this manual.

Remain alert for unusual noises, which could signal a problem. Visually inspect the machine for any abnormal wear or damage. A good time to detect potential problems is while performing scheduled maintenance service. Correcting the problem as quickly as possible is the best insurance.

Clear away heavy build-up of grease, oil and dirt, especially

in the engine and under the seat platform areas; minute dust particle are abrasive to close-tolerance engine and hydraulic assemblies.

Inspect mower daily for grass clippings and wire or string tangles. The underside of the mower deck will collect a build-up of grass clippings and dirt, especially when grass is wet or has high moisture content. This build-up will harden, restricting blade and air movement and will probably show a poorer quality of cutting. Therefore it should be removed routinely.

To do this it will be necessary to raise and block the deck using jack stands or blocks in the full up position. Scrape the build-up from underneath.

Some repairs require the assistance of a trained service mechanic and should not be attempted by unskilled personnel. Consult your Hustler® service center when assistance is needed.

Torque Values

WARNING

Particular attention must be given to tightening the drive wheel lug nuts and blade spindle bolts. Failure to correctly torque these items may result in the loss of a wheel or blade, which can cause serious damage or personal injury.

Torque values are given below:

	Ft-lbs.	N-m
Wheel (lug) nuts	70	95
Blade spindle bolt top	60	81
Blade spindle bolt bottom	48	65

Lug nuts only - It is recommended that these be checked after the first 2 hours of operation, initially, every 50 hours and following removal for repair or replacement.

For all other torques refer to the mower's *General Service Manual* for standard torque chart. See *Product Literature* section for ordering information.

For engine torque values, see engine owner's manual.

Tires

It is important for level mowing that the tires have the same amount of air pressure. The recommended pressures are:

Drive wheels . . . . . 8-12 psi (55-83 KPa)
Front wheels . . . . . 8-12 psi (55-83 KPa)

If you wish to use non-pneumatic tires on your Hustler® mower the tires must be an approved tire purchased from Hustler® Turf Equipment. Warranty claims will be denied on any mower equipped with unapproved non-pneumatic tires.

Lubrication

Use SAE multi-purpose grease.

Electrical System

The electrical system is a 12 volt, negative ground. Recommended battery size is a garden tractor BCI group U1R with 225 or better cranking AMP rating. A maintenance-free battery is recommended. Otherwise, follow battery manufacturer's maintenance, safety, storing and charging specifications.

WARNING

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm. Wash hands after handling.

WARNING

Charge batteries in an open well-ventilated area, away from sparks and flames. Unplug charger before connecting or disconnecting from battery. Wear protective clothing and use insulated tools.

WARNING

- Avoid skin and clothing contact with battery acid.
- Always wear eye protection when checking the battery. Acid can cause serious injury to skin and eyes. If contact occurs, flush area with clean water and call a physician immediately. Acid will also damage clothing.
- Do not drink the battery electrolyte.
- Do not allow open flame near the battery when charging.
- Hydrogen gas forms inside the battery. This gas is both toxic and flammable and may cause an explosion if exposed to flame. Always remove the negative ground first and replace it last.
- Do not overfill the battery.
- Electrolyte may overflow and damage paint, wiring or structure. When cleaning the battery, use soap and water. Be careful not to get soap and water into the battery. Clean the battery terminals with a solution of four parts water and one part baking soda when they become corroded.

WARNING

Shorts caused by battery terminals or metal tools touching metal mower components can cause sparks. Sparks can cause a battery gas explosion which will result in personal injury.

- Prevent the battery terminals from touching any metal mower parts when removing or installing the battery.
- Do not allow metal tools to short between the battery terminals and metal mower parts.

WARNING

Incorrect battery cable routing could cause damage to the mower and battery cables. This can cause sparks which can cause a battery gas explosion which will result in personal injury.

- Always **disconnect** the negative (black) battery cable(s) before disconnecting the positive (red) cable(s).
- Always **connect** the positive (red) battery cable(s) before connecting the negative (black) cable(s).

Master in-line fuse

These mowers have a master in-line fuse in the electrical system. This is the main fuse to protect the complete electrical system. It is located under the seat platform and next to the solenoid. Figure 4-1

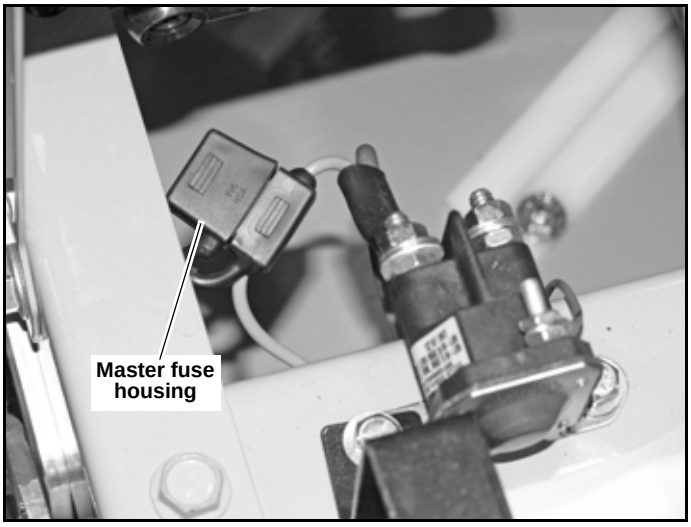


Figure 4-1

Hydraulic System

The transmissions are sealed for life and do not require any scheduled maintenance.

WARNING

When washing the mower, direct the spray away (especially if using a power washer) from the transaxle's seals to prevent water intrusion and ensure component performance.

Fuel And Evaporative Emissions Control System

The fuel and evaporative emissions control system for this mower is EPA compliant. Use only Hustler® approved replacement parts.

Your evaporative emission control system may include parts such as: fuel tanks, fuel lines, fuel line fittings, fuel caps, carbon canisters, canister mounting brackets, carburetor purge port connection, filters, vapor hoses, clamps, control valves, control solenoids, electronic controls, vacuum control diaphragms, purge valves, liquid/vapor separator and other associated components.

Modifying or Tampering with the evaporative emissions control system or the fuel system is prohibited. Federal law and California State law prohibit the following acts or the causing thereof:

1. The removal or rendering inoperative by any person other than for purposes of maintenance, repair, replacement, of any device or element of design incorporated into any equipment for the purposes of emissions control prior to or after its sales or delivery to the ultimate purchaser or while it is in use, or
2. The use of the equipment after such device or element of design has been removed or rendered inoperative by any person.

WARNING

Use of replacement parts not equivalent to the original parts may result in system failure and pose a safety hazard.

DANGER

To avoid personal injury or property damage, use extreme care in handling fuel. Fuel is extremely flammable and the vapors are explosive.

WARNING

Observe usual fuel handling precautions

- Do not smoke while refueling. Extinguish all cigarettes, cigars, pipes and other sources of ignition.
- **Do not remove fuel cap or fill tank with engine running or while engine is hot.** Clean up any fuel spills.
- If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
- Allow engine to cool before storing machine inside a building.
- Keep fuel away from open flame or spark and store machine away from open flame or spark or pilot light such as on a water heater or appliances.
- Use extreme care when handling gasoline and other fuels. They are extremely flammable and vapors are explosive. A fire or explosion from fuel can burn you and others and can damage property.
- Refuel outdoors. Never refuel or drain the fuel from the machine indoors.

- Never attempt to start engine when there is a strong odor of gasoline fumes present. Locate and correct cause.
- Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30 day supply of fuel.
- Do not fill fuel containers inside a vehicle or on a truck or trailer bed with interior carpets or plastic truck bed liners. Always place fuel containers on the ground away from your vehicle before filling.
- When practical, remove gas powered equipment from the truck or trailer and refuel the equipment with its wheels on the ground. If this is not possible, then refuel such equipment on the truck or trailer using a portable container and not a fuel dispenser nozzle. If a fuel dispenser nozzle must be used, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
- Never use gasoline for cleaning parts.
- Read and observe safety precautions elsewhere in this manual.

WARNING

- Gasoline is harmful or fatal if swallowed.
- Long-term exposure to vapors can cause serious injury and illness.
- Avoid prolonged breathing of vapors.
- Keep face away from nozzle and gas tank or fuel container opening.
- Keep gas away from eyes and skin.
- If fuel is spilled on clothing, change clothing immediately.

The fuel tank is located under the seat platform with the filler neck and fuel cap located in the left side fender. Figure 4-2

Remove the fuel cap slowly.

When threading the fuel cap onto the filler neck, tighten the cap until it begins to click, then, continue to turn it until at least three clicks are heard.

IMPORTANT: Do not overfill the fuel tank. The fuel tank should be filled **no higher than the bottom of the fill neck.** The fuel system is designed to leave room for the fuel to expand with fuel temperature changes.

WARNING

Overfilling fuel tank may cause the following:

- **Engine damage**
- **Fire hazard!**

Use regular unleaded gasoline with an octane rating of 87 or higher. Maximum of 10% ethanol (E10) in fuel. Fuels with greater than 10% ethanol, (such as E15, E20 and E85) voids warranty. Fuels with greater than 10% ethanol are not approved for use and such illegal use could cause equipment failure and pose a fire hazard.

Refer to the engine owner's manual for fuel specification requirements.

Figure 4-2

Engine Oil And Filter

WARNING

If the engine has been running and is up to operating temperature, allow the engine to cool before changing the oil. Engine and engine oil will be very hot, so be very careful when changing oil and wear the appropriate protective gear to avoid being burned or exposed to engine oil.

Check engine oil daily and after every 4 hours of operation. Mower must be on a level surface when checking oil. Refer to engine manual and maintenance schedule for oil recommendation and capacities.

Change the engine oil and filter after the first 5 hours of operation and then per the engine manufacturer's recommendations after that. If mower is being operated in extremely dirty conditions, then it is recommended oil be changed more frequently.

IMPORTANT: After the new oil filter has been installed, clean up any oil which may have spilled onto the engine plate, muffler, and heat shield.

Draining the engine oil :

1. Locate the oil drain valve on the lower right side of the engine.
2. Locate the oil drain hose that was supplied with the machine. Be sure to clean and clear it of debris that might block the flow of the engine oil. Figure 4-3
3. Attach one end of the hose onto the oil drain valve nipple. Make sure the hose is pushed all the way onto the valve.
4. Position the loose end of the hose forward and down in

front of the right side transmission so that it can drain into a suitable oil drain container.

5. With the hose in position, use a 10 mm wrench or socket and open the valve approximately 4 turns in the counterclockwise direction. Allow 10 minutes for engine oil to adequately drain.
6. After oil is drained, close the valve by turning it in the clockwise direction until it is fully closed.
7. Once the valve is closed, carefully remove the oil drain hose and clean up any spilled oil.
   IMPORTANT: All oil drips or spills **must** be cleaned off of the exhaust system before operating the machine.
8. Clean the oil drain hose and store it appropriately. Figure 4-3

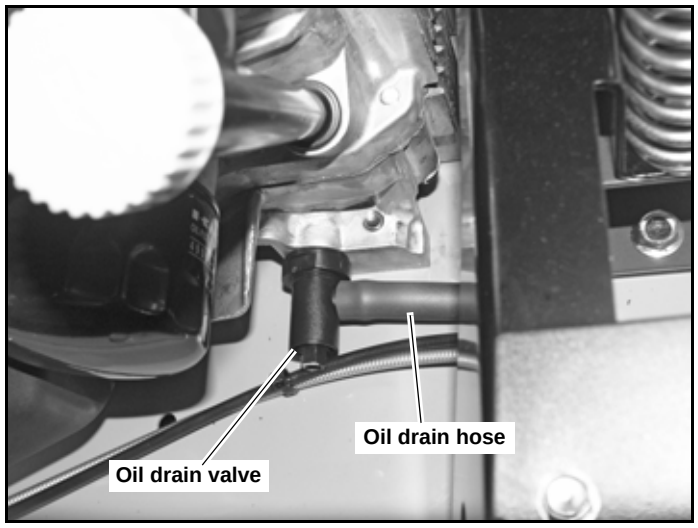


Figure 4-3

Engine Air Filter

Perform engine air filter maintenance per the *Maintenance Schedule* shown elsewhere in this manual.

General Engine Maintenance

Detailed instructions and recommendations for break-in and regular maintenance are specified in the *Engine Owner's Manual*. Please refer to this manual for engine servicing, lubricating oil levels with quality and viscosity recommendations, bolt torques, etc. The engine warranty is backed by the manufacturer. Special attention should be paid to applicable data which will not be duplicated here.

Carbon Canister

Some Hustler® Raptor® mowers have a carbon cannister incorporated into the fuel system.

This is a mandatory feature on all mowers using gasoline engines that are put into operation in California.

This canister should be replaced every 5 years or if it becomes damaged.

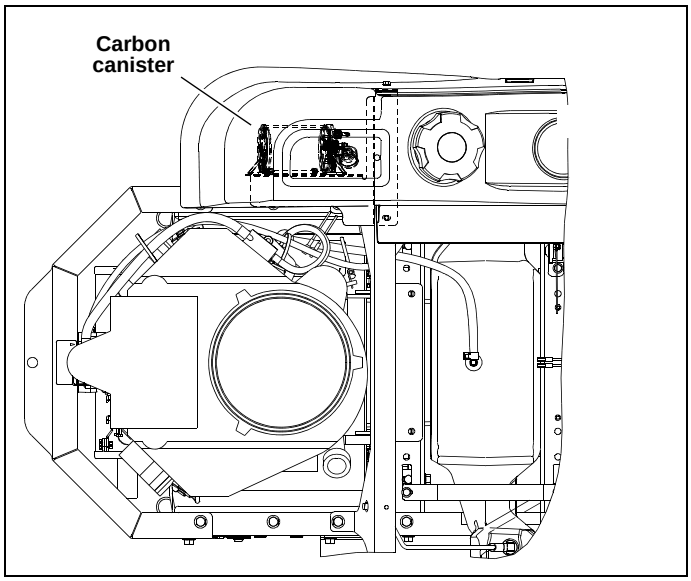


Figure 4-4

Fuel Evaporation System Filter

All Hustler® Raptor® mowers have a fuel evaporation system filter. This filter must be checked and replaced every 100 hours or annually whichever comes first. Figure 4-5 & Figure 4-6

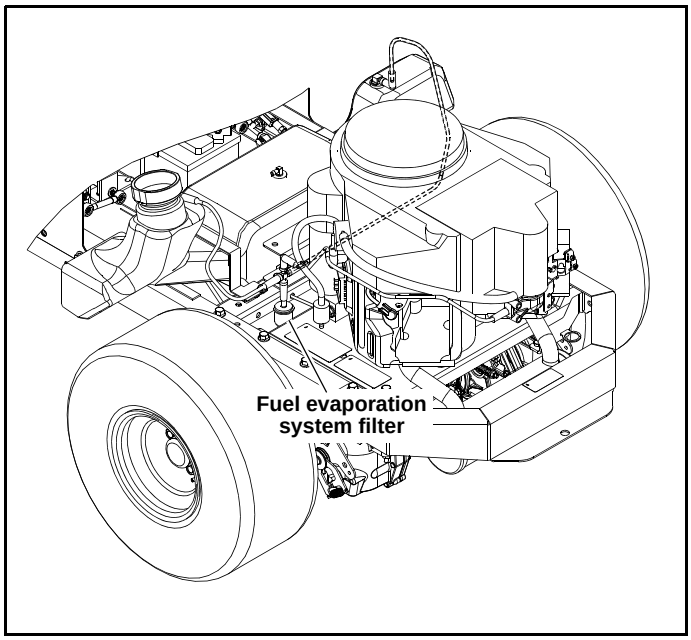
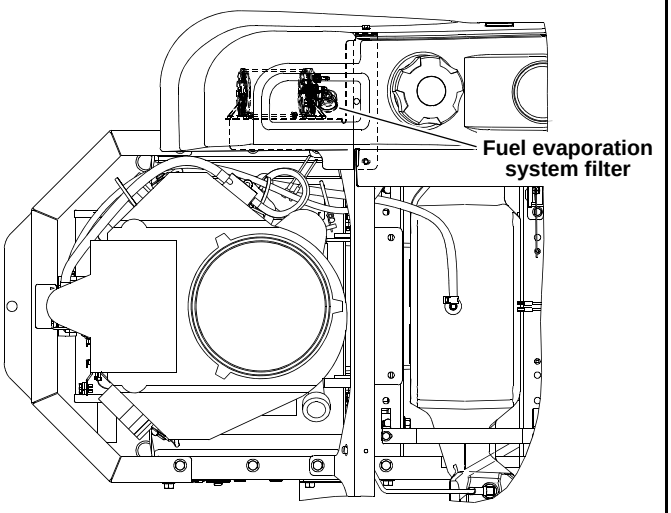


Figure 4-5

Belts

Inspect belts frequently for wear and serviceability. Replace a belt that shows signs of severe cuts, tears, separation, weather checking and cracking, or burns caused by slipping. Slight raveling of belt covering does not indicate failure, trim ravelings



Carbon canister equipped machines

Figure 4-6

with a sharp knife.

WARNING

If the pump belt fails, loss of control will occur especially when operating on a slope. **If you lose steering control while operating the machine, place the steering control levers in the park brake position immediately. Inspect the machine and involve your Hustler® Dealer to resolve the problem before continuing to operate.**

Inspect the belt pulley grooves and flanges for wear. A new belt, or one in good condition, should never run against the bottom of the groove. Replace the pulley when this is the case, otherwise the belt will lose power and slip excessively.

Never pry a belt to get it on a pulley as this will cut or damage the fibers of the belt covering.

Keep oil and grease away from belts, and never use belt dressings. Any of these will destroy the belt composition in a very short time.

Mower Blade Maintenance

Check the mower blades daily, they are the key to power efficiency and well groomed turf. Keep the blades sharp. A dull blade will tear rather than cut the grass, leaving a brown ragged top on the grass within a few hours. A dull blade also requires more power from the engine.

Replace any blade which is bent, cracked or broken.

WARNING

Never attempt to straighten a bent blade by heating, or weld a cracked or broken blade as the blade may break and cause serious injury. Replace worn or damaged blades.

WARNING

Never work with blades while engine is running or deck clutch switch is engaged (on). Always place deck clutch switch in the **disengaged** position, place steering control levers in the park brake position and turn engine off and disconnect negative battery cable. Block up mower when you **must** work under it. Wear gloves when handling blades. **Always check for blade damage** if mower strikes a rock, branch or other foreign object during mowing!

WARNING

Always wear adequate eye protection when grinding mower blades.

Mower Blade Removal

Use a 5/8” wrench to remove the 7/16” cap screw holding the blade to the spindle shaft from underneath. **NOTE:** A blade holding tool (part number 381442) is available from Hustler® Turf Equipment. It is designed to prevent the blades from rotating when they are being removed or installed on the spindle. Contact your Hustler® dealer for more information.

Sharpen the blades on a grinder following pattern as shown (Figure 4-7). Touch-up sharpening can be done with a file

Check the blades for balance following grinding. A commercial balancing tool is available through most hardware supply stores, or balancing can be done by placing the blade on an inverted line punch or 5/8” bolt. Blade should not lean or tilt. Spin the blade slowly, blade should not wobble. If blade is out of balance, true it up before reinstalling.

Lay the blade on a flat surface and check for distortion (Figure 4-8 & Figure 4-9). Replace any distorted blade.

Do not re-use spindle bolts which have stripped, worn or undercut threads. Torque bolts on spindles to 48 foot-pounds (65.14 Nm) when reinstalling blades.

IMPORTANT: The blade sail (curved part) must be pointing upward toward the inside of the deck to ensure proper cutting.

IMPORTANT: The spindles have 5/8" diameter boss that centers the blades on the spindles. When re-installing blades, ensure that the blade is centered on the boss and seated flat against the spindle shaft face. Rotate the blades after installation to ensure blade tips do not touch each other or sides of the mower. Figure 4-10

WARNING

Failure to correctly torque the bolt may result in the loss of the blade which can cause serious injury.

WARNING

Mower blades are sharp and can cut. Wrap the blade(s) or wear gloves and use extra caution when servicing them.

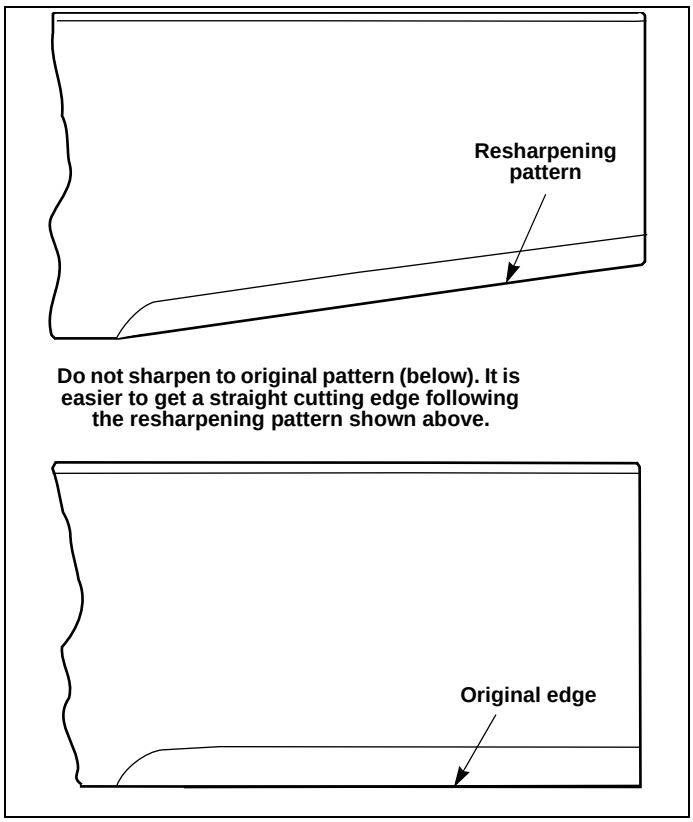

Resharpening pattern
Do not sharpen to original pattern (below). It is easier to get a straight cutting edge following the resharpening pattern shown above.
Original edge

Figure 4-7

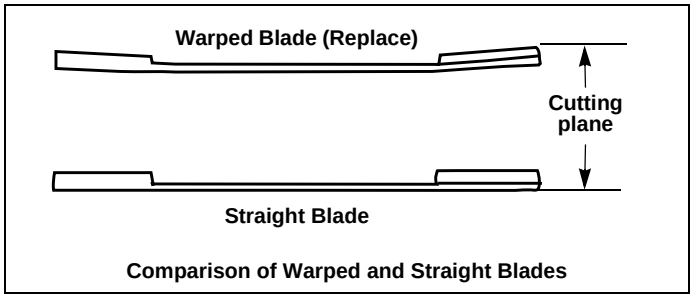


Figure 4-8

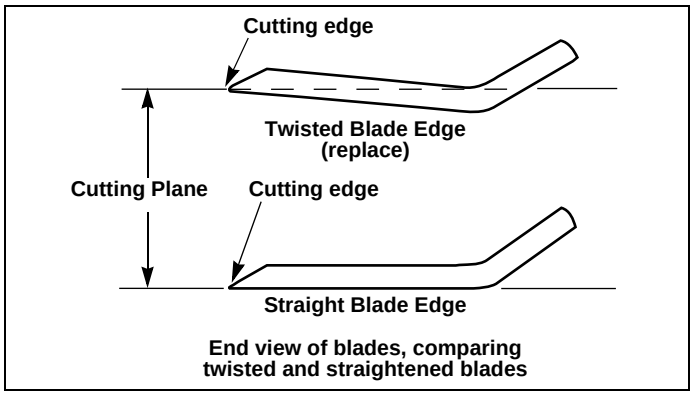


Figure 4-9

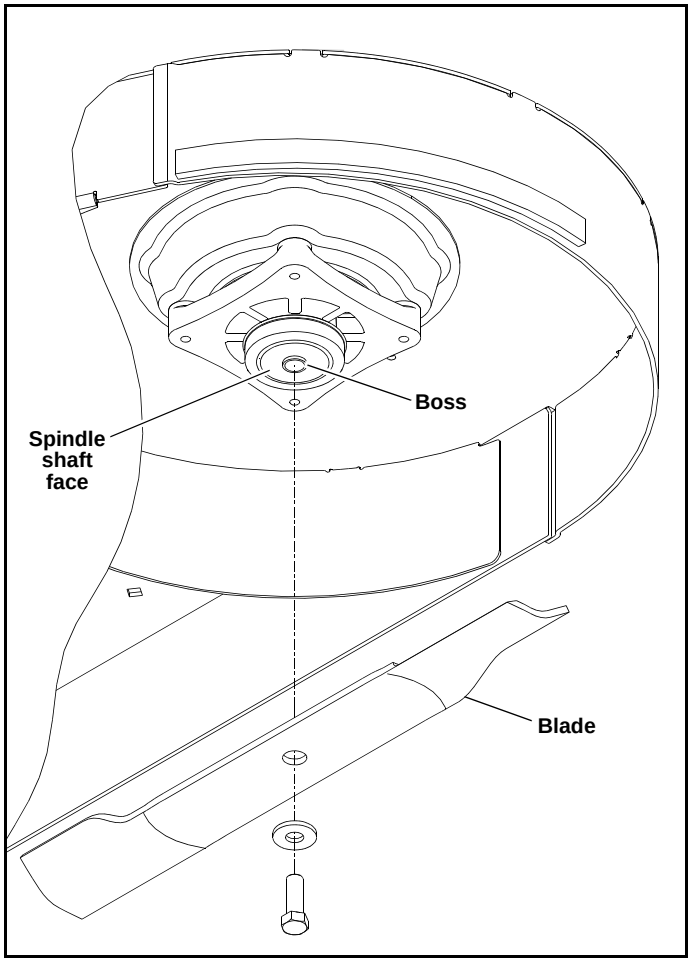


Figure 4-10

Seat Adjustment

The seat on the Hustler® Raptor™ mower can be adjusted forward and rearward by pivoting the seat platform up and forward. Then, loosen the four cap screws on the underneath side of the seat platform. Position the seat where you have the best control of the machine and are the most comfortable and then tighten the cap screws.

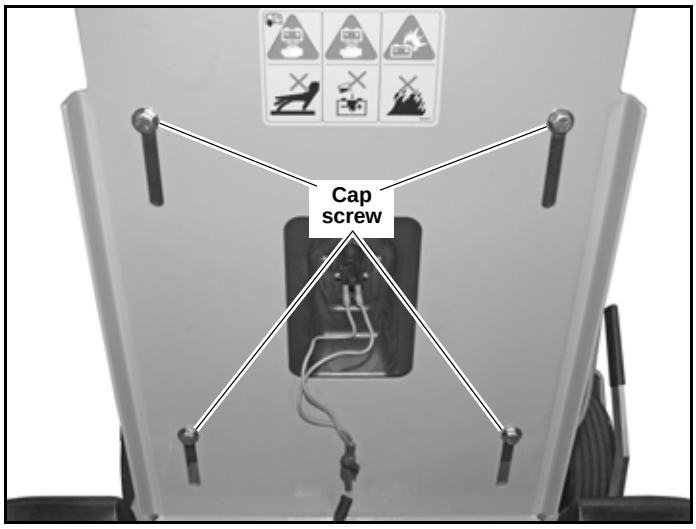


Figure 4-11

Steering Control Lever Adjustment

The steering control levers can be adjusted for operator comfort. By loosening the cap screws that attaches the upper control lever to the lower lever (Figure 4-12), the upper control lever can be pivoted to fit the operator's personal preference.

The steering control levers can also be adjusted up and down. Remove the cap screws and slide the upper control lever up or down and align the holes in it with the holes in lower lever. Re-install the cap screws and tighten.

The steering control levers should be adjusted so that they align with each other when in the neutral position.

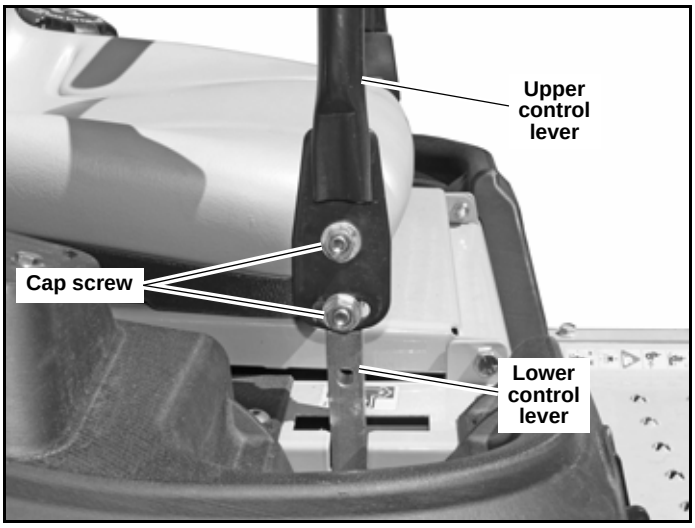


Figure 4-12

Maintenance Schedule
Refer to Figure 4-13, Figure 4-14, Figure 4-15, Figure 4-16, Figure 4-17 Figure 4-17, & Figure 4-18

	WEEKLY OR 40 HOURS	ANNUALLY OR 100 HOURS
Verify safety start interlock system	Prior to each use	
Visually inspect unit for loose hardware and/or damaged parts	Prior to each use	
Visually inspect tires	Prior to each use	
Check oil level, engine (1)	Prior to each use or every 4 hours	
Clean air intake screen (4)	Prior to each use or every 4 hours	
Check fuel level	Prior to each use	
Blades - sharpen & securely fastened	Prior to each use	
Discharge chute - securely in place & in lowest position	Prior to each use	
Check tire pressure with a gauge	Prior to each use	
Clean engine and transaxle compartment	After each use	
Grease gauge wheel bearings	X	
Change engine oil & filter (1)(3)	X	
Check battery connections	X	
Clean engine exterior (a)	X	
Replace air cleaner paper element (4)		X
Check pump & deck belt tension and condition (5)		X
Check fuel system (6)		X
Check fuel tank grommet (6)		X
Tighten lug nuts on wheels (2)		X
Change fuel filter (6)		X
Replace fuel evaporation system filter (7)		X

NOTES:

1. Initial oil change is after 5 hours of operation. Thereafter, change oil after every 40 hours operation. Change more often under dusty or dirty conditions and during hot weather periods.
2. Torque initially and after first 2 hours of operation.
3. Change engine oil filter per the engine manufacturer's recommendations. Refer to Engine Owner's Manual for recommendations and other maintenance items..
4. Service more often under dusty or dirty conditions.
5. **Pump drive belt only - Inspect every month** and replace if worn or cracking is noticed. Otherwise, **replace every 2 years**.
6. Check fuel system for any crack or leaks including, but not limit to, fuel line hoses, fuel valve, vent line hoses, vent valve, vapor valve, carbon canister, and grommets. Replace as needed.
7. More often under dusty or dirty conditions and during hot weather.

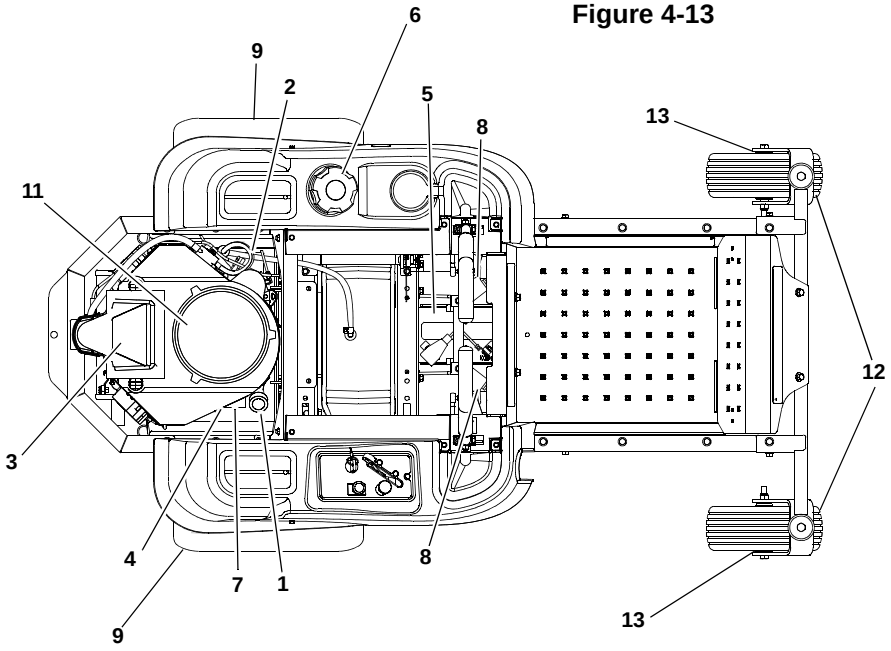
REFERENCES:

A. Refer to engine owner's manual for engine service information.

NOTE: After completing maintenance cycle (100 hours), repeat cycle.

Maintenance Locator Chart

Figure 4-13



1. Engine Oil Fill & Dipstick
2. Fuel Filter
3. Engine Air Cleaner
4. Engine Oil Drain Valve
5. Battery
6. Fuel Tank
7. Engine Oil Filter
8. Park Brake Switch (2)
9. Drive Tire
10. Pump Belt
11. Engine Air Intake Screen
12. Front Wheel Tires
13. Front Wheel Zerks (2)
14. Deck Belt
15. Blades
16. Fuel Evaporation System Filter
17. Carbon Canisters

Figure 4-14

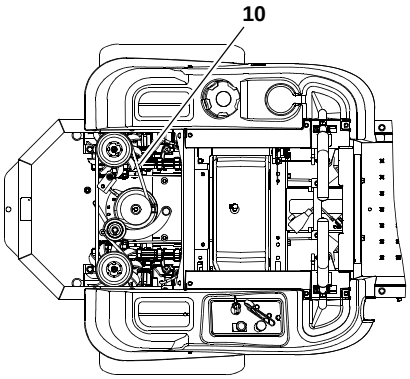


Figure 4-15

36”/42” Deck

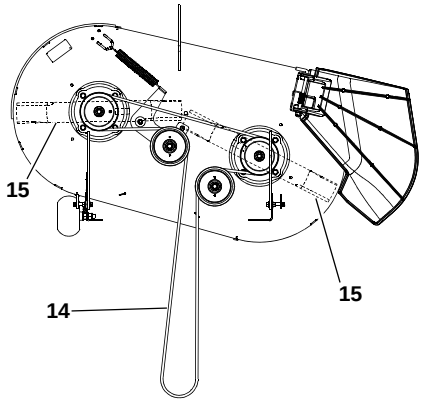


Figure 4-16

52” Deck

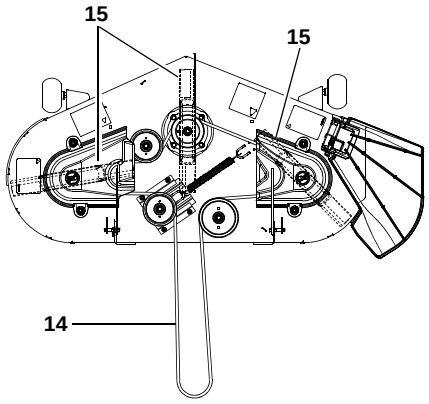
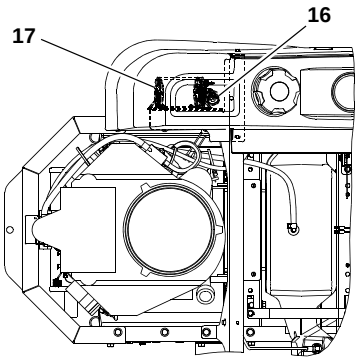


Figure 4-17



Carbon canister equipped machines

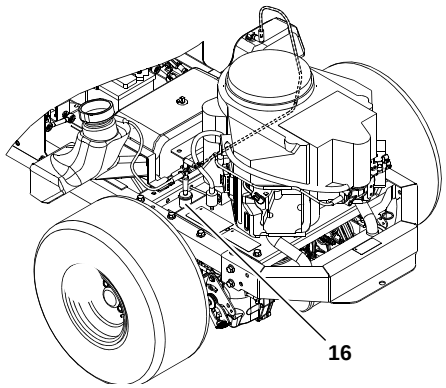


Figure 4-18

TROUBLESHOOTING

The majority of operating problems that occur with a system can be traced to improper adjustments or delayed service. A consistently applied preventative maintenance program, as outlined in the *Maintenance* section of this manual, will prevent many problems. The following chart is designed to help you locate a problem by suggesting probable causes and the recommended solutions.

SYMPTOMS	PROBABLE CAUSES	SUGGESTED REMEDIES
Starting motor does not crank	Steering control levers not in park brake position or switch not adjusted	Place steering control levers in park brake position or re-adjust switch
	Deck clutch switch engaged	Disengage clutch switch
	Weak or dead battery	Recharge or replace
	Electrical connections are corroded or loose	Check the electrical connections
	15 amp fuse is blown	Replace the 15 amp fuse
	For additional causes	See engine manual
The engine will not start, starts hard or fails to keep running	No fuel or line plugged	Fill tank or replace line (See *Fuel System* section for more details)
	There is incorrect fuel in the fuel system	Drain the tank and replace the fuel with the proper type
	There is dirt in the fuel filter	Replace the fuel filter
	Dirt, water or stale fuel in the fuel system	Contact your Dealer
	The choke is not on	Move the choke lever to ON
	Numerous	See engine manual
Engine: Runs with continuous misfiring or engine runs unevenly or erratically	Numerous	See engine manual
Loss of power or system will not operate in either direction	Restrictions in air cleaner	Service air cleaner
	Poor compression	Contact your Dealer
	Steering linkage needs adjustment	Adjust linkage
	Tow valve open	Close tow valve
	The traction drive belt is worn, loose or broken	Install a new traction drive belt
	For additional causes	See engine manual
Air cooled engine overheating	Air intake screen or cooling fins clogged	Clean screen and fins
	For additional causes	See engine manual
Low engine oil pressure	Low oil level	Add oil
	Oil diluted or too light	Change oil and check for source of contamination
	Failed oil pump	Contact your Dealer
High oil consumption	Numerous	Contact your Dealer
Mower jerky when starting or operates in one direction only	Steering control linkage needs adjustment	Adjust linkage
	Loose steering linkage	Tighten linkage
	Transaxle component faulty	Contact your Dealer

SYMPTOMS	PROBABLE CAUSES	SUGGESTED REMEDIES
Mower creeps when steering control levers are in neutral	Steering linkage needs adjustment	Adjust linkage
Mower circles or veers in one direction	Steering linkage needs adjustment	Adjust linkage
	Loose steering linkage	Tighten linkage
	Tires improperly inflated	Adjust air pressure to 8 - 12 psi (55 - 83 KPa)
	Transaxle component faulty	Contact your Dealer
Mower creeps when parking brake engaged	Steering linkage out of adjustment	Adjust steering linkage
	Brakes need adjustment	Adjust parking brakes
There is abnormal vibration	The engine mounting bolts are loose	Tighten the engine mounting bolts
	The engine pulley, idler pulley or blade pulley is loose	Tighten the appropriate pulley
	The engine pulley is damaged	Contact your Dealer
	The cutting blade(s) is/are bent or unbalanced	Install new cutting blade(s)
	A blade mounting bolt is loose	Tighten the blade mounting bolt
	Spindle bearing is worn or loose	Replace or tighten spindle bearing
	A blade spindle is bent	Contact your Dealer
Blades do not rotate	The deck drive belt is worn, loose or broken	Install a new deck drive belt
	The deck drive belt is off the pulley	Install the deck drive belt and check for a reason
	Electric clutch is not engaging	Check and/or replace 15 amp fuse. Contact your Dealer
Uneven cutting height	The blade(s) are not sharp	Sharpen the blades
	A cutting blade(s) is/are bent	Install new cutting blade(s)
	The deck is not level	Level the deck per the *Deck leveling* section of the General Service Manual
	An anti-scalp wheel is not set correctly	Adjust the height of the anti-scalp wheel
	The underside of the deck is dirty	Clean the underside of the deck
	Tires improperly inflated	Adjust air pressure to 8 - 12 psi (55 - 83 KPa)
	A blade spindle is bent	Contact your Dealer

STORAGE

When storing the unit at the end of the mowing season, the mower, engine, and battery should have the following items serviced before storage.

If the mower has been stored for an extended period of time, follow the new season preparation steps before beginning operation.

General mower preparation for storage

1. Remove all grass, dirt, and trash from mower and cutting units.
   IMPORTANT: Wash the machine with a mild detergent and water. Do not pressure wash the machine. Avoid excessive use of water, especially near the control panel and engine.
   Clean mower and deck and touch up all scrapes with touch-up paint.
2. Install new air filter per Engine Owner's Manual.
3. Check thoroughly for any worn or damaged parts that need replacing and order them from your dealer.
4. Thoroughly lubricate machine, according to the *Maintenance* section.
5. Block mower up so weight is off tires. Check tire pressure and inflate to proper operating pressure.
   NOTE: Do not deflate tires.
6. Perform separate engine and battery preparation as listed below.
7. Store mower in a clean, dry place.

Preparation of engine for storage

When the engine is to be unused for long periods, proceed as follows:

1. Run the engine for a minimum of 15 minutes.
2. Drain the oil from the crankcase while the engine is still warm.
3. Refill with fresh oil of the proper viscosity.
4. Drain the fuel tank and run the engine until it stops from lack of fuel. Gasoline evaporates if left in the carburetor for long periods, forming gum and varnish deposits in the carburetor. These deposits will cause engine flooding and loss the previous 100 hours.
5. Remove the spark plugs and pour a tablespoon of engine oil into each spark plug hole. Install plugs, but do not reconnect plug leads.
6. Crank the engine with the starter at least a dozen revolutions to distribute oil over the cylinder walls and valve mechanism.
7. Clean the exterior surface of the engine. Spread a light film of oil over any exposed metal surfaces of the engine that are subject to corrosion.
8. Clean dirt and chaff from the cylinders and fins, blower housing and muffler.
9. Check the oil filler cap and fuel tank caps to make certain they are securely in place.
10. Refer to the engine manual for more information.

Preparation of battery for storage

When the machine is to be unused for long periods, it is best to disconnect the battery and remove it from the unit. At this time perform the following battery maintenance:

1. Remove the battery from machine.
2. Clean the battery, terminals, and cable connectors.
3. Charge the battery, if necessary.
4. Store the battery in a cool, dry place (do not expose to freezing temperatures).
5. Always keep the battery fully charged. Especially important to prevent battery damage when the temperature is below 32°F (0°C).

New season preparation

Before starting the mower following post season storage, the following service is required:

1. Clean mower, removing trash and dirt accumulation.
2. Check engine oil and hydraulic oil levels.
3. Fill fuel tanks with fresh fuel. Run machine at half speed for 5 minutes, checking operation of steering control lever. Stop engine and check for oil leaks, loose fittings and so forth.

WARNING

At start of new season always check that fresh oil has been added to machine. If oil is drained at season's end and not replaced, engine damage will result.

4. Tighten any bolts that have loosened and make sure all hair pins, cotter pins and clevis pins are in place.
5. Install all safety shields and review safety precautions listed in this manual.
6. Check and inflate tires to 8-12 psi (55-83 KPa).
7. Install fully charged battery and attach the battery cables.
8. Refer to engine manual for more information.

PRODUCT LITERATURE

If you would like to view or print a copy of the product manuals (Operator's Manual, Parts Manual, or General Service Manual) for these mowers go online to www.hustlerturf.com and click on the *MANUALS* button.

Contact your local Hustler® dealer if you require another engine manual.

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